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The Society is not responsible, as a body, for the facts and opinions advanced in the papers published by it.

A GLANCE BACK AND A LOOK FORWARD¹

BY RALPH S. HOSMER

Retiring President, Society of American Foresters

In fulfillment of the custom that lays on the retiring President the duty of giving some account of his stewardship before he doffs the robes of office and passes them over to his successor, I am glad to speak to the members of the Society assembled here tonight. I have but one or two things to say about the past year. I then wish to direct attention to certain matters that it seems to me should be considered by the Society.

The past year has been marked by no momentous happenings, but it may, I think, be regarded as one of progress for the Society. One new Section, Ohio Valley, has been formally received into the fellowship. There has been a notable increase in membership. A number of new committees have been set up whose work may be expected to be marked by accomplishment. And in one matter of national importance the Society has at least made itself heard by the appearance of its representative before the U. S. Senate Committee on Reforestation.

Early in the year the Society sustained a great loss in the passing of one of its honored Fellows, a former President of the Society, Dr. Bernhard E. Fernow, the beloved Dean of American Forestry. It is not needful here to add to the tributes that have been paid to Dr. Fernow as a forester and as a man. But in thinking of him we must always be grateful that it was given the profession of forestry in America to have as one of its early leaders one so blest with versatility, force, and breadth of vision as was he.

In the early autumn several of the Sections of the Society had the good fortune to have as guests certain of the delegates to the British

¹ Delivered before the annual meeting of the Society at Baltimore, December 7, 1923.

Empire Forestry Conference, held this summer in Canada; particularly Lord Lovat, chairman of the British Forestry Commission, an honorary member of this Society, Mr. R. L. Robinson, and Prof. R. S. Troup of Oxford. It is to be regretted that these and others of the British foresters were unable to remain for a longer time in this country, when other Sections of the Society might also have had the opportunity to entertain them. Face to face meetings like this go a long way toward establishing international friendships. One of the things in which personally I am very deeply interested is the bringing about of close relations between the foresters of other nations and ourselves. I believe that much of mutual benefit may result from such contacts.

Now a word as to the work of the year. To some members of the Society the Executive Council may seem to be a rather intangible body, to which we annually elect a member but of which little is heard in the succeeding months. Let me assure you that the council is very much on the job. It is true that its members are seldom able to meet for personal conference. That is one of the penalties of our form of organization. Most of the business of the Society has to be done by correspondence. But a lot can be and is accomplished in that way. Let me here record my sincere appreciation of the hearty cooperation that as President I have had from all the members of the council this past year.

One of the important duties of the council is to pass finally on questions of membership, both as regards new members and as to advancements from the grade of Member to that of Senior Member. Notwithstanding the many statements that have been made in the JOURNAL and elsewhere regarding the policy now being followed by the council in this matter (for example, Dana's letter in the JOURNAL for February, 1923), there still seems to be uncertainty in the minds of many members of the Society as to just what constitutes eligibility to Senior membership. Without going into detail it may be pertinent to state here that for several years now the council has consistently adhered to these two cardinal points: (1) That save in very exceptional cases, initial entrance into the Society should be to the grade of Member; (2) that advancement to the grade of Senior Member, while it may follow soon thereafter, should depend on evidence of substantial accomplishment in some branch of forestry, and not be granted merely as the result of the faithful performance of routine duty. The desire

and intent of the council is to make Senior membership a recognition of achievement. The purpose behind all this is of course to strengthen the Society as a professional body and thus to give its utterances greater weight when the Society takes a stand as the representative of the profession of forestry in the United States.

In regard to strengthening this Society in general through a further recruiting of new members, I wish to make an emphatic appeal. Throughout the country there are many professional foresters who are not members of the Society; graduates of recognized schools, men of excellent standing as regards their work, who nevertheless for one or another reason have never identified themselves with this national organization. In May I sent out a letter to all the forest schools, urging that each faculty see to it that their eligible graduates were proposed for the Society. Similar requests have gone to the Sections. There has been a gratifying response, but there yet remains a long list of men who should be enrolled. Were the present membership doubled it would still not include all those who would appear to be eligible for admission. I believe it is the duty of each Section of the Society to make sure that every qualified forester within its area has at least been given the opportunity of being proposed for the Society.

There are so many advantages to be derived from bringing the total enrollment up to what it should be, that the desirability of such action should be apparent to every one. When it can be truly said not only that this organization represents the foresters of the country, but also that it numbers in its ranks an overwhelming majority of all those in the profession, its dictum on any question cannot fail to command a respectful hearing. Further, a larger membership will mean increased power within the profession. More members means, incidentally, more money. The Society needs funds for expanding its activities. With a larger circle of readers the influence of the JOURNAL will be increased. With a larger circulation of the JOURNAL more advertising can be secured, which in turn will help to defray its cost and lead the sooner to putting that publication on a twelve-issue a year basis. Again, the more rapidly our membership increases, the sooner shall we come to a point where we can afford to employ a paid Secretary. These are no new arguments. But I believe we should keep these needs constantly before us.

For one of the committees appointed this year I want especially bespeak the cooperation of all members of the Society; that which

has for its purpose the gathering of material relating to the history of forestry in this country. Munger, in his report, will doubtless ask for such help. Let me second and endorse his suggestions. With every passing year it becomes more and more difficult to obtain documents, papers, and other material that are of very real historical value, as bearing on the early development of forestry in America. We also need personal statements from the older men in the profession first-hand accounts regarding the how and why of important happenings, the intimate inside stories of what did or did not come to pass. The committee will safeguard this material. Some day a historian will arise in our midst who will work it up. All of us can help now to secure such data before they are lost.

Of the other committees I need not speak here, for one of the chief features of this Baltimore meeting is to afford opportunity for the discussion of the questions raised by their reports.

Turning now to look ahead I wish to say one or two things about the future. The need which I believe impresses itself most forcibly on all of us who have watched and helped in the development of the Society is that the Society of American Foresters be made to stand out unquestionably as the spokesman of the profession of forestry in the United States. This is no new thought. But each year adds to its importance. Just how to accomplish what we desire is one of the points we have come here to discuss. Shall it be through the medium of paid Secretary, or by some other method? As it is, with loose organization and lack of funds, the council is obliged per force to let pass, one after another, opportunities where the Society ought to take an aggressive stand. This situation ought not to be allowed to continue. Especially is this of moment now when there seems a real likelihood of the early enactment by Congress of far reaching legislation that shall expand our national forest policy.

In appearing before the Senate Committee in September, I more or less committed the Society to an endorsement of the points contained in the Clarke bill, but I think I made it clear that these by no means constituted the whole of what was needed to put forestry fully into effect in this country. The Society is in a position where it can lead, if it will. It can assist both the Federal Forest Service and the local forest services of the several States, but it can often go much farther than can these bodies in bringing about action in ways that count. Furthermore, as was so cogently pointed out by Sparhawk in his annual report as Secretary a year ago (JOURNAL, January

23), there are opportunities for cooperation with other organizations that as yet lie untouched, to say nothing of this Society coming to be regarded as the recognized authority on questions pertaining to technical forestry subjects. I am absolutely in agreement with the arguments then presented. I commend them to all members of the Society.

The problem of getting forestry into general practice throughout this country is one that is complex in its details, but simple in its broad outlines. It seems to me that just now the need is to emphasize a few, big, outstanding things that must be done first, whatever may follow later. There is apparently much less diversity of opinion within the Society now than was the case even a couple of years ago. I can but feel that if we were to set up a program consisting of a few big things and then were unitedly to support and work for them, we should mightily hasten the time when forestry would become an actuality in practice in many parts of America.

Further, it seems to me that were the Society to assume leadership through the enunciation of a sane, just, and logical program of policy, it would find that it had set up a standard that would become a rallying point for other organizations interested to a greater or less degree in the wise use of the forests.

Less than a month ago in New York City forestry topics were one of the leading items of the program of the Engineering Association meetings. The recent referendum of the United States Chamber of Commerce set a large number of business men to thinking about forestry. Some of them will soon be looking for accurate, trustworthy data on which to base their future position on forestry questions. The American Forestry Association ought soon to reach a point where it can give more widespread service in popular education and in the molding of public opinion than it can now. But when it comes to questions involving technical procedure, it is to the Society of American Foresters that they should be directed.

I am not arguing at all that the Society become an information service organization, or that it usurp in the least the field of the American Forestry Association. What I do believe is that the Society has a unique opportunity to set up and maintain a set of objectives to work toward. It should then be prepared to back reasonable measures as they are framed, legislative and otherwise, that aim to realize these objectives in practice.

To bring this matter concretely before the Society, I have prepared and append hereto an enumeration of objectives that will illustrate the sort of statement that I have in mind might be formulated by the Society. This draft might be used as the basis for an official statement to be issued with the sanction of the Society as a declaration of its position at the present time on the matter of a national forest policy. The items enumerated have already, I think, the approval of a majority of the members of the Society. None of them is new, and within the profession few should be regarded as controversial. A formulation of them may, however, tend to crystallize the views of some members.

We may reasonably expect that some of these objectives will be attained in a relatively short time. Others will take longer to bring to pass. And, of course, new needs and new aims will constantly arise. It seems to me that the Society should definitely endorse the few things that at this time are of outstanding importance in forestry in this country. We have discussed details for four years, but we have never as a body come out clearly in support of an organic program. Were such an enunciation of policy to be made and given circulation, I believe that it might come to serve as a standard that would guide other organizations.

I therefore present as a first draft for such a pronouncement the following statement of policy of the Society of American Foresters regarding the national forest policy:

The Society of American Foresters believes that the time is ripe for a further development of our national forest policy. To this end it recommends the enactment of such legislation by Congress and by the legislatures of the several States as may be necessary to attain the following objectives:

1. *Prevention of forest fire.*—To be brought about through cooperative action between the Federal Government, the several States, and the individual land owners.

2. *Just taxation of forest properties.*—To be secured through the enactment by the individual States of laws having regard in each case to local conditions, but based in principle on the theory of a tax on the yield, collectable at the time of the harvest of the forest crop.

3. *Increased public ownership of forests.*—To be brought about by action on the part of the Federal Government, the several States, and by local communities, including counties, cities, towns and villages.

In measures designed to realize this objective the Society believes that acquisition should be in accordance with these principles:

(A) As regards Federal ownership, the existing area of National forests should be expanded, (1) by the setting apart of such portions of the remaining public domain as are better suited to the production of forests than for use for other purposes; (2) by the continuation and extension of the policy of purchasing forest lands on which a forest cover exerts a beneficial influence on the navigability of navigable streams; (3) by the acquisition by any appropriate means, including purchase, of such areas of cut-over or of idle lands as in the judgment of the Forest Service should be added to the forest holdings of the Federal Government. This clause is to be understood to mean that the Society does not endorse the wholesale purchase of all cut-over land that might be offered to the Government, but rather that the land so acquired should constitute what may be termed the "key areas," especially in those sections of the country where there are extensive tracts of land suitable only for forest production.

(B) As regards State and local ownership of forests, the same general principles should apply as above suggested for a Federal policy of acquisition. But in the building up of state forests, especially where cut-over and idle lands are in question, the Society believes that much greater use can be made by the States of their powers of devoting to forestry purposes lands that have reverted because of the non-payment of taxes, than has been common in the past.

4. *Reforestation of waste or idle land, whether in public or in private ownership.*—The Society believes that public aid in reforestation should be applied particularly to the establishment of forests through planting on areas of land suitable only for forest production, where a forest of valuable species can not be secured by natural production.

5. *The introduction of systematic forest management on all forests in the United States, public or private.*—The Society holds that the most feasible way to achieve this result is through cooperation between the Federal Government, the several States and the individual owners, under regulations that shall have been approved by the Secretary of Agriculture; the guiding idea of such forest management to be continuous forest production, under the principle of sustained yield.

6. *The encouragement and support of research in forestry.*—To be secured through adequate financial support by both Federal and

State Governments of investigative work of the type that is now being conducted by the Forest Experiment Stations and by the Forest Products Laboratory of the U. S. Forest Service.

7. *Better care of woodlots and other farm woodlands throughout the country.*—To the end that the owners of such properties may be aided to a legitimate extent in this direction, the Society recommends that a liberal attitude be taken by both Federal and State Governments in the support of what may be termed "extension work in forestry."

8. *The reduction and ultimate prevention of waste.*—To be effected so far as may be practicable and within reasonable limits, by the introduction of measures that shall attempt to stop waste, both in the woods and during the process of manufacture, as regards all forest products. To bring about the saving of valuable material, the Society recommends that all forest land owners give careful study to measures designed to eliminate this kind of loss. Wherever practicable the close utilization of all products harvested from the forest should be the ideal to be striven for.

I submit the above suggestions for the consideration of the Society with the recommendation that action be taken that will lead to the formulation and publication by the Society of a statement similar in intent to that just outlined.

THE RELATION OF THE SOCIETY OF AMERICAN FORESTERS TO THE PROFESSION OF FORESTRY¹

BY H. H. CHAPMAN

Retiring Vice President of the Society

From time to time foresters within or without the Society raise the question as to what are its true functions and purposes, and whether it is accomplishing any good, has any definite aims and is worthy of their continued support. Judged by results, it issues a JOURNAL of eight numbers containing mostly technical papers and reviews, holds an annual meeting at which more papers are read and internal affairs of management may be discussed, with an occasional outbreak over contested points of policy, and has given birth to a number of active sections at which further dissemination of technical information is secured and various proposals originate for the decentralization of control especially as to membership qualifications.

It is time we looked deeper. The atmosphere needs clarifying. It is the writer's belief that the Society holds within itself the power to preserve the profession of forestry in America from a disintegration which without such active agency is almost certain to take place, and that if it is successful in this task, the entire movement of forestry will be immeasurably advanced, while failure means the heaping up of difficulties almost insurmountable in the path of actual forestry practice. This belief is based in turn on an opinion derived from observation extending over a period almost commensurate with the span of active work in forestry in this country, to the effect that the establishment of actual forestry practice in Nation, State, or private fields has by and large been the work of technical foresters, that the leadership has come from them, the ideas and practical plans are based on their contributions, and that without them all other forces, economic or individual, would fall flat. So great is the effect of the inspirational leadership of foresters imbued with the ideals of the profession that with men of this type at the head of National, State, or private activities numbers of non-technical men in turn become permeated with the spirit and methods

¹ Delivered before the annual meeting of the Society at Baltimore, December, 1923.

of the profession and their contribution towards the results achieved is considerable. But left to themselves, would they ever have been able to even get started? And if foresters withdraw and leave the work entirely in their hands, will they be able to bring the matter to a successful conclusion?

Great economic forces today are working for forestry, but these same forces may also in the absence of strong and honest forestry leadership be turned against forestry and are as capable of destroying it as of furthering it. Let no one imagine that the force of enlightened self interest, or individualism, is self regulating, and guarantees the future prosperity of the race or the establishment of forestry, or that purely economic laws, independent of the exercise of collective foresight and provision for the future, will prevent forest denudation or will grow trees for our future needs. The phrase, "forestry must pay," is subject to more than a single interpretation. On the other hand, the forces of forest conservation are gaining strength daily; but when not directed tend to run wild and fight with blind intolerance for the segregation and bottling up of unreasonably large areas of forests to serve the single purpose of parks and recreation regardless of the welfare and needs of the public in the use of wood. The great and indispensable force of individual initiative almost always proves destructive unless controlled and moderated in the interests of all, by the forces working for the common good. The ideals of the technical forester are constructive and creative, and these ideals alone are capable of harmonizing the violent centrifugal tendencies of those extremists on the one hand, who favor untrammelled individual license, and on the other, those who would permit no cutting whatever. Without this guidance and control, these two forces will, I am satisfied, result speedily in the practical elimination of wood from our economic life, and the ruin of forestry as a profession. As to the proper adjustment of the elements of private initiative, public initiative, and public restraint on private liberty of action, differences of opinion both as to principles and as to measures must continue to exist. We are dealing not with one force, but with *two*, both striving in the main for the same ends, but by different methods. Neither can be wholly right or wrong, each can be beneficial to the other, or can in turn be destructive to the other according to the wisdom, judgment and timeliness of the measures adopted for *adjustment* of these forces to serve the common welfare. Without this adjustment, strains are set up and damage results that

may be irreparable. This principle that the tension of two forces may be not only beneficial but necessary is seldom clearly recognized. Each advocate of one of the opposing principles usually tries his best to annihilate his opponents and secure the unfettered play of his particular obsession.

Those champions of enlightened self interest who for some time past have used every public occasion to call attention to the differences of opinion existing among foresters as to the exact adjustment of the strain at the point of contact, namely, public regulation of private initiative, do not realize what a compliment they pay the profession, which is willing to permit and encourage the expression of these differences, that out of discussion may be found the solution of the moment.

This brings us to the first of the basic aims of the Society, which is to afford a forum or medium for discussion of measures either technical or economic, which are of interest to foresters in their professional activities. Much space must naturally be devoted to the presentation of new material of a scientific nature bearing upon the act of growing or utilizing wood crops. Of equal or greater importance are considerations of policy, public and private. But if the Society should depart from its purpose of protecting freedom of opinion intended to get at the facts, and instead, seek to coerce a minority into acceptance of majority opinion it violates this basic function of its existence. Referendums are permissible, but must not be binding on the minority. The Society has stood firm on freedom of expression, throughout its existence.

The real danger does not lie within the Society, but with forces and agencies outside of the Society which may seek, sometimes successfully, to censor the views and dictate the opinions of Society members as expressed before and to the Society, because of their connection with these outside organizations. Any wage earner is by that fact alone apt to be held accountable by his employer for all opinions affecting in any way the activities of this employer. Censorship is not confined to federal bureaus but is particularly strong with private corporations as well, and in state service. The argument that affairs peculiar to a given organization should not be aired in public and that policies of such organizations should not be stated by irresponsible subordinates is the basis for the practice of censorship. But the real cause goes deeper and lies in the failure of such organizations to establish a spirit of understanding and confidence between all grades of employees so that practically any of them can be trusted to express themselves on

suitable occasions and on proper topics. This failure, leading to such restraints, is the product of internal conditions which profoundly affect the welfare of the organization, whether it be National, State, or private. In fact I have never been able to detect any essential differences between public and private organizations or the principles affecting them, and my further remarks must be taken as strictly general and impersonal.

This condition of mind which induces censorship on outside utterances manifests itself along exactly the same lines within the organization itself, and to it may be applied the term, bureaucracy, though this term is usually thought of as applying only to public service. Some of the best or worst examples of bureaucracies the writer has ever seen are certain lumber companies, and big business is full of them. Bureaucracies, whether public or private, need not be corrupt nor inefficient to bring about this censorship of ideas and resultant paralysis of initiative. They need only be bureaucracies and the thing occurs of itself. Therefore, it would be well to try to define a bureaucracy. A bureaucracy is in civil activities, either public or private, what a military organization is in the realm of war. Power centers in the head; ideas come from above. Orders are carried out because they are orders. Discipline is excellent. Results are supposed to be highly effective.

The actual effect of a bureaucracy, however, is exactly the reverse of what is hoped for and intended, hence some fundamental law of human nature must be violated by such a system—and it is. *This law is that of self expression*, which if capitalized and used, secures a wonderful loyalty and extreme efficiency in an organization from top to bottom. But it takes big men and broad men to harness these forces, for little men and narrow men fear them as they would a crown fire or a tornado. They regard them as destructive, and by their attitude they poison them and actually make them destructive. They can only suppress these fundamental instincts by crushing the breath of life out of their organization, driving out of it the more valiant spirits who refuse to be subjugated and deprived of their intellectual joy of life and ambition, and who are too honorable to seek relief in covert back-biting and cynical disparagement of their superiors. This leaves only the husks in their place; time-servers, whose one ambition is to comply with the demands of these superiors in the matter of routine and reports, letting the responsibility for results rest on those who have in their far-seeing wisdom assumed it.

Let us make no mistake. The adherents of bureaucracy frequently strive for efficiency, greatly increased efficiency all along the line, by means of standardization and regulation of all activities, by statistics and by checks. The lazy, the poorly equipped, and the disloyal employees dislike such pressure for results and may fill the air with protest or speedily drop off the payroll, and no harm would be done, provided the efficient, the loyal, the earnest workers are retained. But if a man has more in him than a mere dog or slave like devotion, if he has what counts in human organizations, brains and the desire to use them on his end of the job, and this machine-like ordering of his affairs deprives him of all initiative, so that he is compelled to do things in what he believes to be the wrong way, and no opportunity is afforded even to discuss it with anyone, he is going to either get out or else becomes less, not more efficient.

The responsibility for any organization rests heavily on the heads, since they are the determining force which shapes the trend toward or away from bureaucracy. In general, office men tend to be bureaucratic, while field men resist this tendency. If the office becomes too strong and its influences reach the field, it is possible in time to ruin the best field force ever built up in spite of all traditions of service. Bureaucracy is also a tendency of advancing age in men and in organizations though primarily it is inherent in their dispositions and may spring from several different traits such as, belief in superior intellectual ability which belittles the opinions of others; a distorted sense of responsibility which regards the taking of advice as an indication of weakening; pure laziness which resents the effort required to consider new ideas; the striving for standardization which does not comprehend the infinite variety of conditions and adjustments needed for local effectiveness; the enjoyment of power which prefers to give orders rather than to take counsel; the obsession of loyalty which cannot distinguish between constructive criticism and dissension in the ranks; the inability to judge personnel correctly which unconsciously favors the boot-licker and sycophant and stores up a grudge against the man who says what he thinks.

The whole matter can be summed up as another example of the necessity for two balancing forces held in tension, rather than the triumph of one of these forces over the other. The former status is beneficial and progressive. The latter is destructive. The one force is the ego, necessary to self preservation, yet if allowed to develop un-

checked by any restraining force, it inevitably leads to serious if not fatal consequences. This restraining force may be described as the opinions of others who are equally interested in projects for the common good which represent the objectives of any organization. These opinions may be authoritative, as in a board of directors, or advisory, as from subordinates. But failure to recognize and accept this check and make constant use of it is certain to do definite harm to the organization, largely because human nature is so constituted that any individual requires this restraint, whether self imposed or involuntarily superimposed, otherwise his judgment eventually suffers from overdevelopment of the ego.

This is the explanation for the repeated failures of the autocratic principles which on a military basis should theoretically succeed, and for the success of democratic organization and principles when applied in conformity to the above laws. From the Hebrew we get the maxim "In the multitude of councilors there is wisdom," while from Chinese sources we find this, "Whosoever thinketh that others are not equal to himself cometh to destruction," and I may add, sometimes succeeds first in destroying his organization.

The Society of American Foresters is powerless to correct these tendencies which operate to restrict the free expression of professional opinion, even in meetings of the Society, by members, in the presentation of ideas whose consideration is proper and necessary to the healthy maintenance of intellectual progress in forestry. Such tendencies if they exist, as they do and will continue to as long as human nature is what it is, can only be corrected by those on whom the burden of responsibility rests. The Society can call attention to the danger, and its members can express their opinions when free to do so and let it go at that.

On the other hand, there are common standards or ideals of conduct which it is possible to formulate and agree upon, and which marks the second great purpose of the Society. This common purpose can be clearly and simply defined. It is, *to work constructively and not destructively, and to work for the common good, and not against it.* Unless the Society stands for these principles, irrespective of differences as to measures for their attainment, it is like the salt which has lost its savor, fit for nothing but to be cast out and trodden under foot. This is what we term professional ethics—not a mass of technical rules of conduct formulated to meet all conditions, but a spirit which goes to

the heart of the matter. In practice, the Society has with more or less fidelity, recognized this spirit in their policy of admissions and several applicants have been refused membership because it was believed that they lacked these basic standards. It is equally important that any member now a member, who can be shown to have grossly violated these basic principles, be expelled from the Society, and the profession be to that extent relieved of responsibility for his standards of ethics.

In the formulation and effectual enforcement of a decent standard of professional ethics the Society is standing on firm ground and is in no way restrained by lack of control or jurisdiction for membership in this Society is ours to grant, to withhold, or to rescind. Let us make it stand for something tangible in forestry.

THE FORESTS OF GLACIER BAY—PRESENT, PAST, AND YET UNBORN

BY WILLIAM SKINNER COOPER

University of Minnesota

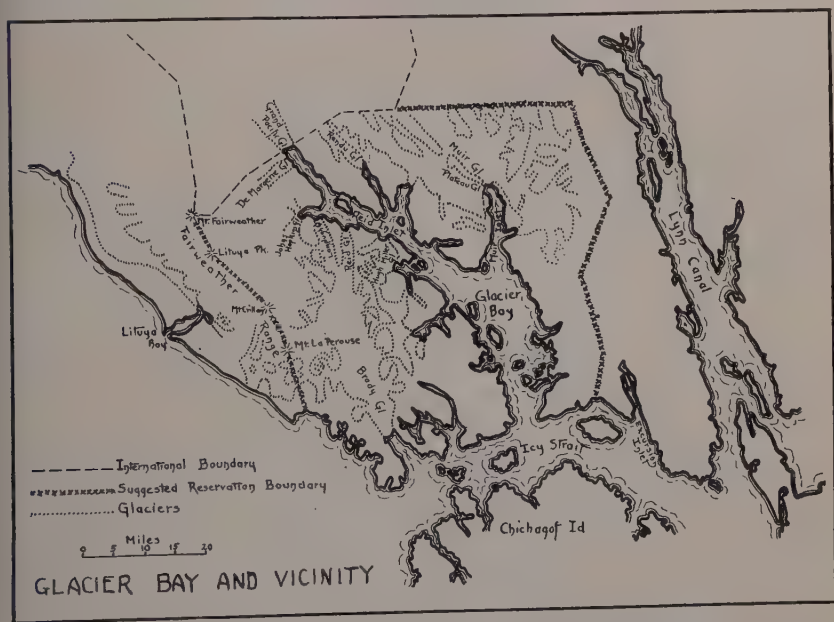
In the year 1794 the British explorer, Captain George Vancouver, sailed through Icy Strait in southeastern Alaska. In his journal he tells us that at a certain point on the north coast of the strait "the shores of the continent form two large open bays which were terminated by compact solid mountains of ice, rising perpendicularly from the water's edge, and bounded to the north by a continuation of the united lofty frozen mountains that extend eastward from Mount Fairweather. In these bays also were great quantities of broken ice." Other statements in the Captain's account identify this spot with the present location of Glacier Bay, which must therefore at that time have been almost completely occupied by a single huge glacier fed by many tributaries arising in the surrounding high mountains.

Late in the fall of 1879 John Muir, in a hazardous canoe trip, guided by Indians, rediscovered Glacier Bay—now a very different sort of place, for the great glacier of three quarters of a century back had receded many miles, dividing in its retreat into two streams which terminated the two main branches of the bay. One of these glaciers was later named for John Muir, and to the other he himself gave the name, Grand Pacific Glacier.

Since Muir's first visit Glacier Bay has become rather well-known, and the Muir is probably the most famous tide-water glacier in the world. The retreat of the ice fronts has gone on with only occasional interruptions, until in 1921 the Muir cliff was 35 miles and the Grand Pacific 60 miles back of the position of the great ice cliff of Vancouver's time. Further division during retreat has brought into being several additional glacier fronts that discharge icebergs into the sea.

Sixty miles of glacial retreat means a strip along the shores of the bay, 60 miles in length, utterly bare and clean, and wide open to colonization by plants. And the colonists have not been slack in their efforts. At Beartrack Cove, not far from the mouth of the bay, there is a dense forest of Sitka spruce which mantles the mountain slope for

a thousand feet above tidewater. The trees average 60 feet in height and the largest is 24 inches in diameter. Great beds of moss a foot and more in depth solidly cover the ground. Altogether it is a fine sample of mature forest, with every appearance, superficially, of having been in possession of the ground for a very long time. And yet I once found here an array of freshly cut stumps, and was able to determine that the trees were only from 50 to 71 years old. Moreover, we know, from Vancouver's account and other corroborative evidence, that this particular spot, only a century and a quarter ago, was buried beneath hundreds of feet of ice. These facts indicate a rapidity of



invasion and development that is amazing, and it becomes even more so when we reflect that under such conditions forest cannot take immediate possession of bare ground, but must be preceded by lowlier forms of plant life, which in various ways prepare a suitable home for it. In other words, there has taken place on the shores of Beartrack Cove, vacated by the ice, a process of vegetational development, called succession, which has culminated in the establishment of a solid covering of conifer forest. Succession is not a hit-or-miss proposition, but an orderly progress of events, subject to definite laws and, under similar conditions, always following the same course.

Although at Beartrack Cove the developmental process is nearly complete, such is not the case at other points on the shores of Glacier Bay, where the period of time since the disappearance of the ice has been shorter. The various stages are, in fact, laid out in beautiful order for inspection and study. Nearest the present ice edges the slopes are utterly bare of plant life; a little more distant we find the lowliest pioneers; a few miles farther on, thickets of willow, and then of alder; and finally the forest. In the next few paragraphs I will briefly outline the course which the successional process pursues.

A rock surface or gravel deposit just bared by retreat of the ice provides anything but a favorable environment for colonizing plants. In the first place, both atmosphere and soil are cold. At one point, less than half a mile from the ice edge, a recording instrument demonstrated a maximum, for a period of 10 days in August, of 56° and a minimum of 35° F., and there was an unusual amount of sunshine during that time. A second unfavorable feature is the extreme lack of organic food materials in the fresh raw soil. Finally, the surface itself is either smoothly polished or subject to erosion by torrential streams. Nevertheless, certain hardy plants can and do grow: a very resistant moss, a lichen or two, a tough, wiry horsetail and an herbaceous plant with bright magenta flowers, the arctic willow-herb. These hardy pioneers are rather insignificant in number and bulk, but they are all-important in that they add organic matter to the crude mineral soil. They are followed by a more conspicuous group which profit by their preparatory treatment. These are certain creeping woody plants which come to cover the ground with a dense carpet. Prominent among them are *dryas*, noteworthy for its feathery brown fruiting heads, and the creeping willows. The Arctic willow, largest of its kind, forms soft, beautiful mats many yards in extent, adorned in late summer with myriads of fluffy pussies gone to seed.

At this point I can not refrain from mentioning a certain delectable little herb that is conspicuous at this sage. Strawberries! Strawberries in uncountable millions! Strawberries as large as the cultivated kind, and incomparably more delicious!

Each stage in the process prepares the way for the next in a very definite manner, by anchoring the soil against erosion, by adding to the amount of organic food materials in it, and by increasing its power to retain water. And also, through this unselfish sort of activity, it inevitably brings about its own elimination. Thus the trailing plants

provide conditions favorable to another group, the bushy willows and the alders. It is interesting to note that the first individuals of these are often as truly prostrate as their predecessors, but, as conditions gradually improve and they develop a firmly established root system, the prostrate stems send up erect branches which become the dominant part of the plant. The trailers, now growing in their shade, may persist for some time, but they are doomed to ultimate extinction because they require much sunlight to maintain themselves successfully:

The alders and the tall willows increase in number and size until they form a dense thicket of bushes often 20 feet in height and almost impenetrable. The result is a further profound change in environment—decrease in intensity of the light that reaches the ground. Certain plants, which up to this point had not found it possible to establish themselves in any number, now encounter conditions that are decidedly to their liking. Most important is the Sitka spruce. Frequent thrifty individuals, unaffected, even favored, by the shade of the alders and willows, grow swiftly up among them and soon overtop them. The Sitka spruce is aided greatly in its campaign by its habit of "layering" or rooting from branches buried beneath the duff, and the tips turning erect, and the branches often developing into independent trees. More and more spruces rise above the alders. The latter struggle bravely on beneath their shade, but inevitably perish in the end, leaving the conifers in control—a pure spruce forest like that of Beartrack Cove. Just one final act remains. Beneath the spruces spring up seedlings of hemlock—both the coast and mountain varieties—and grow into tall trees that add themselves to the company already present. If one examines the reproduction beneath such a stand, he will find in it individuals of spruce and hemlock—no others. The next generation of trees will therefore be like the present. The spruce-hemlock forest is permanent; the succession has attained its final stage, its "climax."

Such is the process which has been going on since the ice began to recede, which is in progress today, and which will continue until the mountainous shores of Glacier Bay are solidly forested with spruce and hemlock—barring one eventuality, the return of the ice, a possibility by no means to be disregarded. Such an event has, in fact, occurred at least once already in the history of the bay—which brings us to the most interesting feature in the entire natural history display of the region.

In certain stream-laid gravel deposits which border the shores of the bay lie buried the relics of an ancient forest—stumps, erect and in growing position, fallen trunks of great size, cones, needles, and much more shortly to be described. Let us look back into the centuries and trace the life history of this forest, the cause of its death, and the manner of its remarkable preservation.

During the great Ice Age practically the whole region was buried beneath the glaciers, only the very highest summits projecting. With amelioration of climate came the waning of the ice sheets, not a continuous retirement, but rather an alternation of advance and retreat, the latter prevailing. How many of these oscillations occurred we do not know, but with the last one we are intimately concerned. Some centuries ago the ice fields were shrunk more than they are today, so that extensive areas, now buried thousands of feet deep, were entirely bare. The period of contracted ice fields was of length sufficient to permit the development of solid climax forest over all the shores of Glacier Bay as we know it today, and doubtless considerably farther toward the high mountain sources of the ice streams. This forest was essentially identical with that of the lower bay at the present time, and it must have developed, following an earlier retreat of the ice, through the same successional progress that I have just described. In fact, we have clear evidence that such was the case, as I will later show.

There came a time when the climate became colder and moister. The ice accumulated in the basins of the high mountains, the glacier streams took on new life and began to creep down once more onto the lowlands. Ahead of them came furious torrential streams carrying gravel in enormous quantity, which settled upon the forest floor and buried the vegetation many feet deep. The trees were surrounded and killed, and many broken off. Then came the ice itself, overriding the gravels, carrying away an unknown amount of them, and bevelling off the trunks of the trees at the new surface level wherever it encountered them. In the region of Muir Inlet the ice of this new invasion was, at its maximum, three thousand feet thick. Century after century the ice thickened and crept forward, finally reaching a point not far from the mouth of the bay.

Another climate change, in reverse direction, and the retreat began which has lasted to the present day. At the time of Vancouver's visit the recession had begun, but had not gone far. Slowly the shores of the bay, mantled with interglacial gravels, came into view. Streams and

waves immediately cut into the deposit, bringing to light the relics of that long entombed forest. And the process still goes on; every year new evidence comes to view, while the old disappears through erosion and decay at an equal rate.

The material thus uncovered is of such satisfactory quality that it is possible to reconstruct the ancient forest in all its essential features and even to trace something of its history through the centuries of its existence. First of all, microscopic study of wood specimens (in perfect condition and not at all mineralized) shows that spruce and hemlock were the constituent tree species as they are today. Moreover, near the mouth of the bay, the forest was practically pure hemlock, while farther up, nearer the sources of the ice streams, the spruce was the more important, plainly indicating a stage in the succession below the climax. This is to be expected, since the interglacial period here would be shorter at both ends than farther from the glacial sources. An age count of one of the largest trunks, a spruce, gives four hundred years as the minimum length of the interglacial period; probably it was much longer. Many of the trees still stand anchored in the crevices of the ancient glaciated rocks; others are rooted in gravels that may belong to a still older glacial period. Groups of suppressed hemlocks, small but of great age, furnish an indication of the full maturity of the forest.

At one locality I was able to discover much concerning the lower growth that accompanied the trees. Waves cutting into a gravel bluff had exposed a thin stratum of peat, representing the ancient forest floor. I cut out several blocks of this and brought them home. In the laboratory I held them under the tap and washed away the silt from the upper surface, whereupon the small plants of the forest floor emerged standing up straight and stiff, firmly rooted in the peaty substratum, in perfect state of preservation down to the minutest detail. Most of the recognizable plants were mosses, and of these thirteen species were identifiable, all of them the same as are found in the forest today. It is surprising that such seemingly delicate plants should be the ones to resist the process of decay.

How did it come about that these minute plants have been kept in so perfect a state of preservation? The clue lies in the fine silt that surrounds them. It is probable that a high hill to the north protected the locality for a time during the advance of the ice. The glacier swept past and dammed this depressed area or side valley, forming for a time

a marginal lake which flooded the forest floor. In this quiet water took place an extremely gentle deposition of rock flour, burying the mosses in their natural growth position without doing them the slightest harm. Soon the pond filled with sediment or else was drained. Stream deposition followed between glacier and mountain, producing an accumulation of gravels of unknown thickness. Finally the ice overrode it all. The compact silty matrix in which the mosses lay buried effectually protected them from crushing by the tremendous weight of gravels and 3,000 feet of glacier ice.

There were other features of interest in that material: whole plants of ground pine, delicate fungus strands perfectly preserved, bark, spruce cones and needles, and even two fragments of an insect's wing, which has been identified as a caddice fly.

A locality nearby yielded much information concerning the history of the interglacial period. Here I found a forest rooted in bed rock, against which rested thick deposits of sediment which contained remnants of two distinct forests, one above the other. The forest on the rock doubtless flourished there during most of the period. It was buried beneath the flood-borne gravels which gradually rose against the slope. After these had accumulated many feet deep, the streams for a time flowed elsewhere and succession began—pioneers, shrubs, and finally forest of spruce. Again the flood, and the spruces were overwhelmed by gravel and silt. One hundred feet of these materials were laid down upon the old forest floor; then another interruption, and again succession. But this time the interval was too short for complete development; the succession attained the alder-cottonwood stage, and then reburial began—another hundred feet of sediment, and finally 3,000 feet of ice. And now we find two rows of tree trunks sticking out of the eroded bluffs, spruces below, cottonwoods above.

Such is the forest history of Glacier Bay—a story of unceasing change; of development followed by destruction, and of renewed activity with every opportunity. Such is the history of every forest; the present differs only in that the processes are in plain view for everyone to see.

It is the firm belief of the writer of this article that Glacier Bay and its surroundings should be set apart as a National Monument. The reasons for such action are five:

The region contains nine magnificent tidewater glaciers in a marvelous setting of lofty peaks. Our present system of national parks

and monuments contains not a single example of the tidewater glacier, one of the most imposing and awe-inspiring of the wonders of nature.

It is very desirable that an area of the magnificent coastal forest of Alaska should be preserved for all time in absolutely natural condition. The Glacier Bay region is uniquely fitted for this purpose because it presents great variety in its forest covering: mature areas, bodies of youthful trees which have become established since the retreat of the ice, and great stretches, now bare, that will become forested in the course of the next century.

The region contains certain features of very special scientific interest: opportunity for the study of glacial behavior and of the movements and development of flora and fauna, and the presence of valuable relics of ancient interglacial forests.

Glacier Bay is far more accessible to ordinary travel than any other region in Alaska where tidewater glaciers are the outstanding scenic feature.

Glacier Bay possesses historical associations, beginning with Vancouver's visit in 1794, and continued especially in the explorations and writings of John Muir.

The writer believes further that immediate action is advisable. The region is totally uninhabited and undeveloped at the present time and therefore there are no interests involved which might be antagonized. The forests are not now particularly valuable, but will in the near future become increasingly so. In short, it is easy to do it now, and will inevitably become less so as time passes.

FOREST ENTOMOLOGICAL PROBLEMS IN THE LAKE STATES¹

BY S. A. GRAHAM

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To treat of all the forest entomological problems of the Lake States in the course of a ten-minute paper is a real undertaking. It is just about as difficult as to persuade a lumberjack that borers in newly killed timber hatch from eggs laid by beetles. He believes and always has believed that these grubs are the natural products of decay and his faith in this conviction is unassailable. This difficulty of my subject having been recognized I shall not attempt the impossible.

Forest entomology in the Lake States is in a primitive condition. In the treatment of insect diseases of trees we are in about the same stage of advancement as were the old-time folk who knew appendicitis as acute indigestion, applied mustard plasters externally, and administered internally mysterious but highly potent compounds guaranteed to cure all human ills.

The lumbermen and timber owners generally, not to mention occasional foresters, look upon insect losses as unavoidable and in the same category as damage by wind. The entomologist is not only confronted by those problems directly concerned with the insects, but he must also overcome a deeply rooted attitude of inertia on the part of those most personally concerned.

Not long ago one of the most prominent lumbermen in this section struck the keynote to the situation when he said, "According to Mark Twain we are always talking about the weather, but no one ever seems to do anything about it. I have always thought of insects in much the same way." This man was certainly taking a philosophical view of a bad situation when we consider that during the past 15 years the larch sawfly has destroyed over 60 per cent of all the tamarack on his holdings, and the spruce budworm has devastated his balsam to the tune of at least 50 per cent. The attitude of this man represents fairly well the stand of most lumbermen in the Lake States toward insect injury. The

¹ Published with the approval of the Director as Paper No. 434, of the Journal Series of the Minnesota Agricultural Experiment Station.

timber owners in this section are not as yet quite face to face with the timber shortage that is pinching the eastern operators. But the time is drawing near when they must either wake up or shut down. Then we shall hear wild cries for help and doubtless both State and Federal institutions will receive their full share of abuse for not having immediately at hand a solution for the entomological problems that the timber trade will then be viewing with alarm. The operators will then forget that the lack of information will be largely due to their laissez-faire policy of today.

So much for the lumberman. Now let us turn our attention toward forestry and see what place entomology plays in the forestry program of today. It has been said that 90 per cent of forestry is protection. We may not all agree to this high figure, but we must admit that without protection the practice of forestry would be as impossible as the raising of both pheasants and foxes together in a small enclosure. Fire, fungi, and insects will easily comprise 90 per cent of our protection problems, and no one can doubt the importance of insects in this triumvirate. In the Lake States region the funds appropriated annually for fire protection, inadequate as they are, may be counted in hundreds of thousands of dollars, whereas up to the present time the funds available for all forest entomological work combined has amounted to less than \$5,000 annually. Is there any wonder that forest entomological work in this section is still in a primitive condition? A person unfamiliar with the whole situation would be justified in assuming from this that in the mind of foresters entomology cuts a very small figure in the development of forestry. But we all know that this is not the case. Most foresters recognize the importance of insects in the economy of the forest and are ready to do all in their power to help along the cause of entomology. They have been prevented from doing much along this line, however, by the general situation with which we are all familiar. Forestry events, like other matters, must progress in proper sequence if they are to progress at all. First must come an appreciation on the part of the general public of the value of forests, then protection naturally follows. Fire, being the most conspicuous devastating agency, naturally receives first consideration, and the fact that entomology in the Lake States has been neglected to the present time indicates that only in part has the attitude of indifference of the public toward forestry and forest protection been overcome.

In the Lake States the attitude of indifference toward this important phase of forest protection has been maintained in the face of

almost appalling forest devastations. Since 1905 the larch sawfly has destroyed over 60 per cent of the tamarack throughout this region. Reliable statistics concerning the actual amount of valuable material destroyed are almost unobtainable, but on the basis of local estimates made in Minnesota it would appear that in this State alone an exceedingly conservative estimate of the sawfly killed tamarack amounts to at least 1 billion board feet and 50 million posts, poles, and ties. At present stumpage rates this represents a cash loss to Minnesota industries of at least \$5,000,000. The total loss in the Lake States can only be a matter of conjecture.

Even the least observant person passing through the regions once occupied by glorious forests of mature tamarack is impressed with the magnitude of the destruction. The average man in the woods knows that the tamarack is largely dead, but nine out of every ten of these men have no idea of what killed the trees. Weather conditions and every other imaginable possibility except insects are given as an explanation, yet these trees were defoliated year after year before the very eyes of these men. Perhaps the placidity of the lumberman's attitude toward insects may be due in part to his failure to connect what he actually sees in the woods with what he hears in the preachings and warnings of the forest entomologist.

The tamarack is now coming back rapidly. The young growth that survived the sawfly attack is growing vigorously and natural reproduction is restocking the vacant areas. This is encouraging! But that is only the bright side of the tamarack situation! The darker side is that sawfly. This pest is still with us. It may be found in any stand of tamarack in the Lake States, or for that matter anywhere throughout the range of the eastern larch. This deadly defoliator is only "biding" the time when conditions are right for another epidemic. Unless we can do something to prevent it, this time is certain to come. Without doubt some method of checking the sawfly can be found. The fact that the most thrifty trees survived the sawfly outbreak is in itself a good lead and may very likely point the way toward methods of forest management that will insure a good crop of this valuable tree in spite of the sawfly.

The recent larch sawfly outbreak is probably the most widespread epidemic of its kind that we have known in this country, but in addition we have had many outbreaks of other insects on a large scale. For some years past we have heard much of the spruce budworm out-

break in New England and eastern Canada. We are told that New Brunswick has lost some 12 million cords of balsam fir and $1\frac{1}{2}$ billion board feet of spruce, and that the killed balsam fir in Quebec totals 50 million cords. With the strong support of the wood using industries of that region, forest entomologists have attacked this problem and are making steady progress toward its solution.

We in the Lake States have also just passed through a budworm epidemic that acre for acre has destroyed as much timber as was destroyed in New Brunswick. It is estimated that 75 per cent of all the balsam in Lake, Cook, and part of Saint Louis Counties in northern Minnesota has been destroyed. This loss totals between 10 million and 20 million cords, a volume of timber not to be lightly passed over. The eastern outbreak has caused a disturbance that echoes far and wide. The Minnesota outbreak, although it is just as serious in character, is passing almost without a ripple in the placid waters of inertia. In the East the timber holders are taking an active part and are assuming their full share of the burden of investigation. In Minnesota the operators are as silent as the great empty spaces of the universe, and only chiefly interested in the loss in so far as it makes possible a reduction in their income tax. Here we have a contrast between a country where a timber shortage is a thing of the present and one where the operators still have a few years' of grace before the pinch that is certainly near at hand.

And recently there has arisen another forest insect problem that threatens to reach alarming proportions. An injurious sawfly has appeared upon the jack pine of certain sections of northern Minnesota and Wisconsin. Some trees have already succumbed to repeated defoliation and more will die next year. Every evidence points to a possible widespread epidemic of this insect. If such an epidemic does occur it will spell ruin to many a settler on the jack pine lands of the North. Will it be possible to arouse sufficient interest in this problem to make its solution possible?

These three defoliators have doubtless given us our most outstanding forest entomological problems in this section. But our troubles do not stop with them. The forest tent caterpillar is almost always threatening to become epidemic. With the continually increasing volume of the temporary aspen type the danger of outbreaks of this pest each year becomes greater and greater. The cottonwood leaf beetle, the yellow-striped oak caterpillar, the cankerworms, and many other defoliators

of deciduous trees are always with us and frequently cause serious damage. The locust borer and the carpenter worms, although they seldom actually kill trees, are responsible for tremendous losses by reducing the quality of the wood attacked. And so we might continue almost indefinitely the list of injurious and potentially injurious forest pests. The emphasis in this paper that has been placed upon defoliating insects is not entirely in keeping with the assumption on the part of many entomologists that the boring forms of insect life are of pre-eminent importance in American forests. But there is no disputing the importance of defoliators in the Lake States and in many other parts of this country.

In this paper we have confined ourselves to insect pests of the forest and have said nothing of the loss in forest products resulting from insect injury. The most reliable statistics available indicate that in the Lake States a figure of \$10,000,000 annually would no more than cover this loss.

Doubtless there is a tendency, in discussing a subject of this sort, to paint a very dark and desolate picture of the situation. When we think of the small progress that forest entomology has made in the past as compared with what should have been done the prospect is discouraging; but when we look toward the future a much brighter prospect is disclosed.

One of the most encouraging features is the development of silvicultural control of forest insects that has arisen out of the application of ecological methods. Instances may be cited where sufficient data are available to form the basis of definite recommendations such as the case of the white pine weevil and the locust borer. Results of investigations indicate that outbreaks of the spruce budworm may be prevented to a greater or lesser degree by proper management. Our greatest hope lies in developing methods of management that will prevent insect epidemics.

Work of this kind calls for the closest cooperation between foresters and entomologists and in the Lake States we are now getting this cooperation. Cooperation of State and Federal agencies in the prosecution of investigations bids fair to produce gratifying results. The spirit of cooperation and mutual helpfulness is in the air and is the harbinger of better times ahead. With this cooperation and with the cooperation of timber owners that is eventually sure to come, the prospect for rapid progress toward the prevention of insect outbreaks is very promising.

EFFICIENT FOREST UTILIZATION—A MAJOR FACTOR IN AN EFFECTIVE NATIONAL FOREST POLICY¹

BY CARLILE P. WINSLOW

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This paper is in the nature of a summation or digest of the most significant factors showing the importance and necessity of efficient utilization of our forest resources in any national forest policy which is to be effective. It is hoped that it may receive the consideration of the members of the Society of American Foresters, and that they will freely give expression to their thoughts and offer constructive criticism and suggestions to the end that this phase of the forest problem may ultimately receive proper recognition in any national policy finally created and adopted.

For his assistance in the preparation of this paper, acknowledgment is made to Rolf Thelen, of the staff of the Forest Products Laboratory.

OBJECT OF A NATIONAL FOREST POLICY

The object of a national forest policy is to perpetuate the production of forest products in quantities necessary to meet the requirements of the nation.

This nation has been fortunate in its wealth of timber resources. They originally covered one-half of the entire area of the United States. They have contributed in an important degree to the growth and prosperity of the country. Upon them have been built industrial, financial, and commercial activities of enormous magnitude and ramifications which in capital invested, value of products, and labor employed collectively rank in the foreground of our national developments. The public at large has become accustomed to advantages and conveniences resulting from the daily use of all forms of forest products to an extent far in excess of that of any other nation.

Because of the rapid depletion of our forest resources, these interwoven activities and interests are facing a relatively early radical cur-

¹ Paper presented at the annual meeting of the Society at Baltimore, December 27, 1923.

tailment and readjustment. This is generally recognized by all who have given even passing thought to the situation. It is because of it that public attention has been awakened to the importance of the creation of a national forest policy.

What can be done to insure to the public a perpetuation of the supply of all products from the forest which are necessary to their convenience and welfare? If curtailment must eventually come, to what extent and in what direction must preparation be made for it? What can be done to protect our waning timber stands and to increase them by more growth? What balance can be struck between a diminished supply of forest resources and increased efficiency in the production and utilization of forest products?

These are the questions which underlie the development of a sound forest policy; they form the skeleton upon which the body of the policy must be created.

MINIMUM UTILIZATION REQUIREMENTS A DETERMINING FACTOR

With our timber, as with our other national resources, we have become accustomed to an extravagant utilization. Many factors have contributed to the existent methods and practices upon which such utilization is based—many arguments might be presented for their justification in the past and for the desirability of their continuation. Interesting as these might be, they are aside from the crux of the situation. It is no longer practically possible to provide a permanent forest supply which will long permit a continuation on our present basis.

It is, of course, of importance to recognize that we have nationally already depleted one-half of the original forest stands of the country, that our per capita consumption is greater than that of any other country, and that we are at present draining our supply at a rate four to five times faster than we are replacing it by growth. The significance of such facts is apparent, but it is equally apparent that they do not in themselves determine that there is any national necessity for a continued forest drain of such magnitude. The essential point for determination is the minimum annual forest cut which, by the most practically efficient methods, will meet our necessary requirements. Only by attention to this critical point can it be wisely determined how far we should nationally attempt to provide a forest supply to the end

that the consuming public may utilize it with a greater or less degree of extravagance or of efficiency.

INTENSIVE FOREST GROWTH AND PROTECTION WILL NOT MEET FUTURE REQUIREMENTS

The importance of the utilization phase of the problem becomes strikingly evident by consideration of the following significant tendencies of the forest supply situation:²

The total available area of forest lands amounts to approximately 470 million acres. This represents one-fourth of the total area of the United States. It includes all forms of land considered suitable for the growing of trees for utility purposes.

Of this area, two-sixths represents our remaining virgin forests, three-sixths is classed as second growth, and one-sixth as practically barren but suitable for trees.

On the area occupied by the virgin forests, losses due to insects, decay, fire, and other hazards offset any increase due to annual growth; on the one-sixth area of barren land there is obviously no annual growth. This leaves but three-sixths, or one-half, of our present total forest land upon which any net annual growth or increment in our forest supply is secured; it amounts, for this one-half of our forest area, to an average of 23 cubic feet per acre—for our entire area of forest land to approximately $11\frac{1}{2}$ cubic feet per acre.

Our present total annual cut for all purposes represents a drain from our forests equivalent to an average annual growth of 48 cubic feet per acre for the entire 470 million acres of forest land, and this does not include the present annual loss in the forests of over $2\frac{1}{3}$ billion cubic feet due to decay, fire, insects, etc. It has been estimated that 58 cubic feet per acre is the maximum average which could be secured by highly intensive forestry. Continuation of the present annual cut will, in a period of from 25 to 30 years, exhaust our present standing timber together with the growth increment in that period.

If the total forest cut remain fixed, normal increase in population will result in a decrease in the per capita forest cut of 20 per cent in 25 years, $33\frac{1}{3}$ per cent in 50 years, 50 per cent in 100 years.

The inevitable conclusions from the foregoing are of impressive significance. Even with liberal allowance for inaccuracies in esti-

² Figures from U. S. Dept. of Agri. Yearbook Article, "Timber: Mine or Crop?"

mates, it appears that our present annual forest drain cannot be maintained from present supplies longer than from 30 to 50 years; to provide a supply to sustain it 100 years hence will require that an average of nine million acres of forest land annually for 50 years be brought to an average growth condition of 48 cubic feet per acre—and this average growth permanently maintained. If such accomplishment can be attained, our per capita forest drain 100 years hence will approximate 50 per cent of the present drain. In the interim, we are facing an inevitable reduction in our total cut of from 50 per cent to 70 per cent—in our per capita cut of from 70 per cent to 80 per cent.

No allowance has been made in the foregoing for losses by forest fire. Without effective fire protection, the situation will be even more acute.

Even with liberal allowances for the unavoidable errors in estimates of such magnitude as the foregoing, there can be no avoidance of the conclusion that intensive forest growth and protection, even if applied and practiced to the entire extent practicable, cannot alone meet the situation.

INCREASED EFFICIENCY IN UTILIZATION IMPERATIVE

Broad acceptance of the foregoing tendencies leads to the inevitable conclusion that we are faced with but two possibilities. However much we may safeguard our future timber supply by fire protection, however much we may increase it by new growth, however much we may supplement it by importation from other countries—and the importance of these elements is indisputable—we will still have to use what we take from our forests with a much higher degree of efficiency and we will have to curtail uses and practices to which we have become accustomed. The necessary degree of curtailment is inseparably related to the possible degree of greater efficiency in utilization.

It is obviously of the utmost importance squarely to face the situation and to develop national action to the end that such material as can be provided may be utilized to the highest degree of national advantage.

CONVERSION LOSSES AND PREMATURE LOSSES IN USE REACH AN ESTIMATED TOTAL OF OVER 60 PER CENT OF THE FOREST DRAIN

This staggering total is made up of a very great number of small wastes and losses occurring in the various wood-manufacturing and

wood-using industries from the time the tree is felled until the finished product has finally reached the end of its usefulness. The loss in manufacture and remanufacture alone is usually estimated to be over one billion cubic feet per annum, an amount which is greater than that required for our entire lumber production. Carelessness and lack of efficient methods of handling and use, coupled with enormous losses due to decay during service make up the balance of the 60 per cent. The single factor of decay annually destroys an amount of timber in service, equivalent to about one-fourth of our annual total forest drain, which is just about equal to the present rate of forest growth. This amount of material, if sawed into lumber, would be sufficient to build homes for about 12 million people every year.

A REDUCTION OF 40 PER CENT IN THE FOREST DRAIN BELIEVED
ULTIMATELY POSSIBLE THROUGH PERFECTED UTILIZATION

It is obviously not possible to eliminate all the present wastes and losses in manufacture and use, even with perfect methods of utilization, but it is just as obvious that a large portion of them are unnecessary and unavoidable. A careful analysis of the character and nature of the losses occurring under present methods indicates that 40 per cent of the present drain is of a nature that can ultimately be eliminated. To accomplish this will require the application of the highest forms of utilization to the entire forest cut, and the diversion of every piece of timber to its best use. It will require, also, the best possible protection of the wood during use. It is anticipated that it will take perhaps a hundred years before this ideal can be approached; it will involve the use and application not only of present knowledge but of further knowledge to be developed by effective research and practice.

ONE-HALF OF THE ULTIMATE SAVING IS NOW IN SIGHT

Analysis of present practice and of the state of the art shows that the best present methods, as demonstrated in actual practice, if applied throughout, would bring about a net saving of at least 20 per cent of the present forest drain. This total would of course be made up of a great many small savings, just as the present wastes and losses are made up of a great many small wastes and losses.

Just as decay in service is the largest single loss, so is decay prevention the largest single possible saving. The annual loss from the

decay of wood in service has been estimated at 25 per cent of the annual cut—a conservative estimate when it is considered that the amount of wood in service and exposed to decay must aggregate at least 25 times the annual cut of this class of material. Present methods of decay prevention can double the life of a large part of this material, and improved methods of construction and protection can prolong the life of much of the rest of it, which cannot well be treated with creosote or other preservative. It seems, therefore, that an estimated saving by decay prevention of slightly less than 6 per cent of the forest drain is reasonable.

Improved woods and mill practice, in the logging and milling of lumber and other forest products, is well recognized as entirely feasible, and much work has been done to determine just how far this can be carried at present. The conclusion drawn from this work is that a combined saving of $5\frac{1}{2}$ per cent can be accomplished. This includes: lower stumps, closer use of tops; more care in felling to avoid breakage; less destructive logging methods; the universal use of thin gauge band saws; care in sawing, edging, and trimming, and similar improvements.

Recent surveys have shown that the loss of material during seasoning and storage is much greater than necessary on the basis of present knowledge, and field experiments have shown that much of this loss can be avoided. It is particularly worthy of note that these losses are not confined to the hardwoods, as might be supposed; the losses in Southern pine alone aggregate over ten million dollars per annum. On the basis of best present commercially practical air seasoning and kiln drying methods, it seems entirely feasible to reduce the seasoning losses an amount equivalent to 3 per cent of the forest drain.

Present manufacturing methods are largely based upon the practice of sawing the logs into boards and then sawing the boards into smaller-sized pieces in accordance with the individual needs. A very great portion of all hardwood lumber and a lesser portion of softwood lumber are finally cut up into comparatively small pieces, which enter into the manufacture of such classes of product as furniture, woodenware and novelties, implements and tools, chairs, case goods, musical instruments, boxes, and crates. These small pieces are classed as "dimension stock" and are usually of high grade material. Analysis of the needs of many wood-using factories has shown that a large part of their needs for wood can be supplied just as well by dimension

stock as by lumber. If, therefore, the dimension stock were to be cut at the mill direct from the log or from woods and mill waste, an enormous percentage saving could be made, and the highest utilization secured. This method is already in use to a small, but growing extent. It represents one of the most simple and direct methods of reducing the forest drain which could well be imagined, and it is anticipated that its application will increase rapidly. On the basis of present knowledge, it seems evident that at least $1\frac{1}{2}$ per cent of the entire forest drain could be saved by the general application of dimension stock cutting at the mill.

The losses and remedies cited are typical. The saving to be effected by those enumerated aggregates about 16 per cent of the total forest drain. A further 4 per cent is divided among twenty or more improved methods and practices, distributed throughout all of the forest products industries.

FUTURE FOREST SUPPLY CUMULATIVELY AUGMENTED BY EFFICIENT UTILIZATION

For any given production, efficiency in utilization means reduction of forest cut. Such reduction of cut becomes at once translated into increased forest supply. This increase is of a form and character of immediate rather than potential value. It is cumulative without additional expense. A saving made today is repeated tomorrow and perpetually thereafter. Improvements in utilization, once established, continue. A board foot saved by improved utilization becomes a board foot saved annually, thus augmenting our waning timber supply.

INADEQUATE RECOGNITION OF EFFICIENT UTILIZATION IN VARIED PROPOSED FOREST POLICIES

While all conversant with the situation admit the importance of efficient utilization, yet it is the elements bearing upon the growth of a forest supply to which public and legislative attention is being chiefly directed. Taxation, protection, land acquisition, planting, regulation of cutting on privately owned lands—these are the elements which at present are receiving chief consideration.

Effective provision for the foregoing in a forest policy will necessarily entail enormous expenditures over an extended period. Relief of forest lands from taxation means reduction in state and federal

revenues by many millions for many years; adequate fire protection means a permanent increase in state and federal expenditures aggregating eight million dollars annually—an amount equivalent to 5 per cent interest on 160 million dollars; land acquisition to be effective in the national situation will require an expenditure of at least 100 million dollars within a limited number of years, and a further expenditure of approximately two or three times that amount if the land acquired is to be made productive; and regulation of cutting on privately owned lands will not only necessitate liberal expenditures but will relate to less than 70 per cent of our forest cut unless applicable to the farm woodlot and other small holdings.

Recognition and adequate provision for the foregoing—and their importance is in no way denied—can not but lead to the conclusion that comparable recognition and provision should be made to insure a high degree of efficiency in utilization. If it is nationally wise and necessary to expend vast amounts of public funds to provide a supply of timber, is it not equally important to do all possible to insure its wise and efficient utilization?

If it is sound to relieve the lumbermen and other forest land owners from taxation, is it not equally sound to assist comparably the wood-using industries and wood users to a higher degree of efficiency?

If it is sound to expend a million dollars a month to protect timber from fire, is it not equally sound to expend comparably to prevent a wasteful utilization of the timber so protected—to prevent the burning from lack of a better use of 15 per cent or more of much of our so-called mill waste? If every forest fire were prevented in the future, the saving would be only about one-tenth that to be achieved through the application of better wood-using practices along the lines definitely pointed out by research. Stamping out the forest fire is recognized as a tremendous problem and one that may well call for the expenditure of a million dollars a month. Stamping out the bad practices in wood utilization throughout the country and replacing them with efficient methods should also be recognized as a tremendous and important problem whose solution is just as tangible as fire protection but which can not be effectively coped with if it is regarded as a minor issue in every forestry program.

If it is sound to expend hundreds of millions of dollars to acquire land to insure adequate forest growth, is it not equally sound to expend comparably to reduce the enormous losses due to decay of

material in service, which now causes annual replacements requiring one-fourth of our total annual forest cut?

If it is sound to regulate the operations on privately owned timberlands to the end that our future supply may be augmented, is it not equally sound to regulate comparably the use and consumption of this supply and thereby further augment the remaining supply?

RECOMMENDATIONS

Such, then, are the broad aspects of the situation. It demands public attention; it will require national action. Fire protection and new growth stand out as salient features demanding broad, liberal, and effective recognition and treatment. Comparable recognition and treatment of efficiency in utilization are necessary to complete the picture. Allied with it is the possibility of assisting the situation by importation from foreign countries.

A complete, balanced, and effective national forest policy should include provision for:

1. Adequate research into the properties and methods of utilization of all forms of forest products, not only from this country but from other countries offering importation possibilities. Results of such work not only lead the way to the ultimate reductions possible in the forest drain, but also are a direct and important factor in ultimately bringing the growth of timber to a financially profitable basis, attractive to capital and to the investor.

2. Comprehensive measures for broad and effective dissemination and application of the knowledge and information available. Special attention should be directed to Federal action and cooperation with States, with trade and industrial organizations, with companies, with individuals, and with educational institutions and agencies, in form and scope comparable to that to be provided for fire protection and forest growth stimulations.

COMMENTS ON INVESTIGATIONS OF TAPERS AS A FACTOR IN THE MEASUREMENT OF STANDING TIMBER¹

By F. S. BAKER

Forest Examiner, U. S. Forest Service

Wright, in the article referred to, has presented some very interesting facts in connection with tree form and its expression by percentages based upon diameters at the base (breast height) of the tree. As the writer had prepared some curves of similar form for Douglas fir (southern Idaho) it was his first object after reading this article to see how Douglas fir compares in form with the conifers mentioned in Wright's article. It was immediately apparent that the sub-classes A and B under spruce, and A, B, C, under white pine proved a stumbling block and indicated fundamental differences. For example, the writer, taking his figures for form class 70, found at a point one-tenth up the tree his value of 96.0 agreed fairly well with Wright's 94.6, white pine form class 75, sub-class A. At two-tenths up the Douglas fir value 90.6 almost coincided with the white pine value 90.2 in the same class and sub-class as before. Of course, farther up divergence arose for a curve in form class 70 can never come very close to one in form class 75. Comparing curves of the same form class fundamental differences were apparent on the merest inspection. Closer examination indicated that this was probably due to the fact that basal flare—sufficient to affect diameters at breast height—was retained in the curves prepared by Wright, while in the Douglas fir curves an attempt was made to eliminate it as it was so variable and erratic that satisfactory means were difficult to determine. Behre² working with western yellow pine likewise eliminated this basal flare. A cursory reading of Wright's article gives the impression that there is no basal flare present in his material.

He states, after mentioning that the taper curves for different species are different, and within the same species the curves for different diameter classes vary, "It has been suggested that these variations in

¹ Wright, W. G. "Investigations of Tapers as a Factor in Measurement of Standing Timber." JOURNAL OF FORESTRY, Vol. XXI, pp. 569-581, October, 1923.

² Behre, C. Edward. "Preliminary Notes on Studies of Tree Form." JOURNAL OF FORESTRY, Vol. XXI, pp. 507-511, May, 1923.

TABLE 1.—*Form of Curves at Base (according to Wright).*

Species	Form class	Sub-class	Tabular difference between	
			Items 1 and 2	Items 2 and 3
Balsam	60	..	6.7	6.4*
	65	..	6.0	5.8*
	70	..	5.0	5.2
	75	..	4.2	4.2
Spruce	60	A	8.9	7.1*
	60	B	8.6	6.7*
	65	A	6.2	5.8*
	65	B	9.1	5.7*
	70	A	5.3	5.3
	70	B	8.0	4.7*
	75	A	4.6	4.1*
	75	B	5.5	3.8*
	65	A	9.5	6.7*
	65	B	10.7	5.8*
White Pine	65	C	12.8	4.8*
	70	A	6.8	5.2*
	70	B	9.3	5.0*
	70	C	10.5	4.2*
		A	5.4	4.4*
	75	B	6.5	4.2*
	75	C	9.0	3.6*

per might be due to the effect of root swelling on d. b. h. and that might be possible to make corrections accordingly. It is certain that variations in taper do occur without root swelling and there was no evidence of root swelling affecting d. b. h. in any of the material examined; even if some of these variations are due to root swelling, as long as they are constant in the same species, as they are, there is no need to make any provision for this." Perhaps he is correct in stating that there was "no evidence of root swelling affecting d. b. h." Nevertheless his tables indicate clearly a concave taper in several classes of trees in the lowest tenth, instead of a convex curve as in the balance of the tree. In concave curves the tabular difference between any two successive items in any column will increase up the tree—or down the column. In convex curves the values decrease. Table 1 shows the tabular differences between the first and second items and the second and third items of all of the columns presented by Wright. All cases showing a concave curve at the base are starred; there are but three unstarred cases. Balsam, form class 70, shows a distinctly convex curve, while balsam, form class 75, and spruce, form class 70 A, are conical, the rate of taper being the same in both cases. Note the high degree

of concavity indicated in white pine, form class 65, B and C. This may not be directly correlated with stump swelling as Wright declares, but at the same time it is obvious that there is a very rapid taper in the lower tenth of most trees, especially in large ones—a basal flare.

Wright appears to think it a normal part of the tree form. The writer and Behre did not. It does not seem that Wright's tables bear out his contentions very well, as the differences in his various columns vary irregularly, indicating insufficiency of data or a very erratic values. As these differences are much more apparent in the lower parts of the trees it is the writer's opinion that they must be due to extremely variable amounts of basal flare in the basic data.

Taking all these tables into consideration, the trees in form class 70 show the least basal flare, it being absent from balsam and spruce A. The writer undertook to remove it from the white pine taper tables. The tabular material was first represented on cross section paper graphically, and new lines representing the lowest tenths of the tree were extended from the point 10 per cent above breast height to the breast height line, simply by eye. This was not difficult as the curves are very flat, closely approaching straight lines up to a point 30 per cent breast height. Under this procedure, the breast height value, instead of being 100 per cent in each case, were as follows:

Form class	A	B	C
65	96.0	95.0	92.2
70	98.5	95.0	93.5
75	99.2	98.0	95.0

New taper tables were then built up on the basis of these new values as 100, assumed as representing the true d. b. h. with basal flare eliminated. This procedure of course changed the form quotient so that the curves no longer represented the proper form classes. For example, C in form class 70 after being modified, showed a form quotient of 74.9, throwing it practically into form class 75. These changes were ironed out through graphic harmonization, very easily indeed, and a new table of tapers was built up for white pine, form class 65, 70, and 75, based upon diameter inside bark at breast height, with stump flare eliminated. Using these taper tables it is unnecessary to have three sets in the case of white pine; one can be used with each form class. In applying these tapers to actual practice, as in building a volume table, it would be necessary to reduce the observed diameters inside bark by a certain amount before applying the table. It all amounts to much the same thing in the end, although the modi-

fied form with only one taper for each form class, seems simpler to the author. Furthermore, is it possible to compare different taper curves for different species, localities, and sites, much more effectively? It is impossible, by the data presented by Wright, to accurately determine how much diameters should be decreased to make allowances for this stump flare. Figuring that the mean diameter of the tree in Wright's class A is 12 inches, class B, 17 inches, and class C, 24 inches, it appears that the diameter should be multiplied by about the following amounts in different inch classes to get the true diameter without flare:

Diameter observed (inches)	Factor
6	1.00
8	99.3
10	98.5
12	97.8
14	97.1
16	96.4
18	95.7
20	95.0
22	94.2
24	93.5

Using some such scheme as this, a smooth gradation can be secured between the different inch classes, whereas using Wright's three taper curves, a sudden jump in values occurs at 15 inches and 20 inches.

In the case of spruce with its two classes, A and B, class A when plotted, shows its value at breast height to fall naturally at 100, or perhaps a very little below. There is no concavity to this curve in form class 70 at least, and so this A curve for form class 70 spruce may be taken as representing the form without any basal flare. The form given for balsam in form class 70, likewise shows a convex form all the way to the base, and may be accepted as representing ideal conditions without flare.

It is interesting to make a comparison in form class 70 between the balsam curve, the spruce curve A, the revised white pine curve—eliminating basal flare, the western yellow pine curve presented by Behre, and Douglas fir curves built up in the same form by the writer. Table 2 shows these figures.

A close similar likeness will be noted between them all, the average difference between them being less than 1 per cent for a greater part of the length of the trees. It is interesting to note that no single species runs consistently close to the mean of them all. In the lower half of the tree, balsam is closest to the mean, while in the upper half, spruce runs closest. There are no consistent variations visible in the

TABLE 2.—Comparison of Taper Curves for Different Species (Basal Flare Eliminated.)

Balsam	Spruce A	Pine	D. fir	W. Y. P.	Max. dif.	Between	Av. dif.	Nearest
95.0	94.7	94.4	96.0	95.5	1.6	P-DF	.5	B
89.8	89.4	88.4	90.6	90.3	2.2	P-DF	.6	B
84.0	83.8	83.2	85.0	84.5	1.8	P-DF	.5	B
77.5	77.4	77.4	77.5	77.7	.3	P&S-WYP	.08	B&DF
70.0	70.0	70.0	70.0	70.0	.0
59.0	60.2	61.3	61.2	60.9	2.3	B-P	.7	S
46.6	48.5	50.6	50.5	50.1	4.0	B-P	1.3	S&WYP
33.0	35.2	36.7	37.8	36.9	4.8	B-DF	1.4	S
17.9	20.0	19.0	21.5	20.6	3.6	B-DF	1.1	S

TABLE 3.—Comparison of Taper Curves of White Pine Form Class 70,
Sub-Classes A and C.

Distance from d.b.h. (tenths of tree height)	A	C	Difference
1st tenth.....	93.2	89.5	3.7
2d tenth.....	88.0	85.3	2.7
3d tenth.....	82.8	81.0	1.8
4th tenth.....	77.0	76.0	1.0
5th tenth.....	70.0	70.0	.0
6th tenth.....	61.3	62.0	.7
7th tenth.....	50.6	51.5	.9
8th tenth.....	37.0	37.8	.8
9th tenth.....	20.0	20.0	.0

figures and it seems to the writer that perhaps some of the differences are due to incomplete data and the effect of the personal element in drawing the curves necessary in working up material according to this method. Giving a large mass of data and eliminating stump flare, it would not be surprising if all conifers in the same form class should have nearly the same form from top to bottom.

Compare these slight differences obtained by eliminating basal flare with the difference between white pine A and white pine C in form class 70 (Table 3).

Toward the base of the tree it is evident that the differences is far greater than that noted between different species with the flare eliminated. It is believed by the writer, that no matter what may cause a concave curve in the base of the tree, it is much better to eliminate this by graphic means and to make due correction for it by reducing the apparent d. b. h. inside of the bark. Unless this is done, true similarities in form are lost sight of. In the interests of uniformity it is felt that much would be gained by having all taper tables of this form built up with the elimination of basal flare. The graphic elimination by eye may be objected to as introducing too great a personal equation. In reply to this, I would simply point to the similarity of form shown in Table 2 among five widely scattered species studied by three independent workers, with the essential dissimilarity of form near the base exhibited by trees of different sizes but of the same species, studied by the same man. From the practical side it may be pointed out that if flare is not eliminated, either a great number of taper tables are necessary (Wright's sub-classes, A, B, C, in the case of pine) or only partially accurate values may be used.

THE RELATION OF BARK TO DIAMETER AND VOLUME IN REDWOOD

BY J. E. PEMBERTON, JR., M. S.

One of the factors entering into the estimating of standing trees, is the relationship between bark thickness and tree diameter and volume. The following paragraphs present the results of an investigation of this relationship for redwood, *Sequoia sempervirens*, Endl.

A major part of the basic data used in the analysis was obtained from tree measurements of redwood taken in 1899 and 1900 by the U. S. Forest Service. These measurements were of second growth and some virgin timber, taken in Del Norte, Humboldt, and Mendocino Counties, California. An additional set of measurements was taken from a sample plot of second growth redwood on Big River, Mendocino County, measured by the Forestry Division of the University of California in 1923. For each locality represented on the analysis sheets, the diameters breast high and corresponding bark thicknesses were classified according to inch diameter classes and the averages plotted, bark thickness¹ over d. b. h. In every case this relation appeared to be essentially rectilinear, furthermore the straight line drawn in each case passed approximately through the origin. This shows that the ratio between bark thickness and d. b. h. may for all practical purposes be treated as a constant.

Variations of this constant between different localities are shown in Table 1, which includes all the second-growth stands. Although the evidence is not conclusive, since the range of sites involved is somewhat limited, it appears that *location affects negligibly the bark-diameter relationship*. The only group varying materially from the average is that from South Fork, and this contains but fourteen trees, a number too small to give reliable results.

Although many individual older trees had about the same percentage of bark as the average second growth tree, at the age of from 200 to 300 years the average per cent of bark at breast high seems to have fallen off by from 3 to 5 per cent of the tree diameter. This is shown in Table 2 by the measurements taken from virgin timber, and can be explained by the fact that redwood, although fibrous barked, is always

¹ Bark thickness as used in this analysis is d. o. b. minus d. i. b.

TABLE 1.—*Bark-diameter Relationship in Second-growth Redwood.*

Locality	Age	Bark—d. b. h. ratio	No. of trees
	<i>Years</i>	<i>Per cent</i>	
Trinidad, Humboldt Co.....	17-26	16.0	475
Wenger's, Del Norte Co.....	18-30	15.6	435
Big River, Mendocino Co.....	20-66	15.0	121
Scotia, Humboldt Co.....	33-100	15.0	46
Eureka, Humboldt Co.....	26-40	16.0	43
South Fork, Humboldt Co.....	25-30	14.0	14
Weighted average		15.6	
Total number of trees.....			1134

subject to some abrasion which decreases its relative bark thickness in these older trees. A considerably greater decrease might be expected in a species with a scaly bark.

TABLE 2.—*Bark-diameter Relationship in Virgin Redwood.*

Locality	Age	Bark—d. b. h. ratio	No. of trees
	<i>Years</i>	<i>Per cent</i>	
Fort Bragg, Mendocino Co.....	300-700	12.6	50
Scotia, Humboldt Co.....	200-900	13.0	23
Weighted average		12.7	
Total number of trees			73

One data series was in such form as to permit investigating the influence of crown class on the per cent of bark. The conclusion, as Table 3 shows, is that crown class does not have any appreciable effect on the bark-diameter relationship.

TABLE 3.—*Effect of Crown Class on Bark-diameter Relationship. Big River Plot.*

Class	Age ²	Bark—d. b. h. ratio	No. of trees
	<i>Years</i>	<i>Per cent</i>	
Dominant	51-66	14.9	27
Codominant	47-65	14.8	34
Intermediate	44-65	15.6	18
Suppressed	20-64	14.7	42
Weighted average		14.9	
Total number of trees			121

² This stand was approximately even-aged, but on cutting was found to contain a considerable proportion of younger trees, chiefly concentrated in the lower crown classes.

The variations in the ratio between bark and diameter at different heights was found by taking measurements at $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ the total height of the trees. At these points, as may be seen in Table 4, the per cent decreases from the value at breast high, in a relatively regular fashion, from about 15 per cent at breast high to 10 per cent at a point three-quarters of the way up the tree.

TABLE 4.—*Variation in the Bark-diameter Ratio at Different Points on the Tree.*

Locality	D.b.h.	$\frac{1}{4}$ ht.	$\frac{1}{2}$ ht.	$\frac{3}{4}$ ht. ³	No. of trees
Trinidad	16.0	12.6	11.0	...	475
Wenger's	15.6	12.6	10.8	...	435
Big River:					
Dominant	14.9	11.4	10.6	...	(27)
Codominant	14.8	12.1	10.8	...	(34)
Intermediate	15.6	12.6	11.1	...	(18)
Suppressed	14.7	12.6	10.9	...	(42)
All crown classes	15.0	12.2	10.9	10.5	121
Scotia	15.0	11.5	10.0	9.0	46
Eureka	16.0	13.8	11.0	11.0	43
South Fork	14.0	12.6	9.7	...	14
Weighted averages.....	15.6	12.6	10.7	10.2	
Total.....	1,134

³ The data were such that bark thickness on only a few sets could be obtained at three-fourths of the total height.

As there appear to be no wide variations on account of locality, crown class or age up to 100 years, all the breast high measurements below that age were combined into one curve, shown in Figure 1. In some of the individual graphs referred to above there appeared to be a slight tendency for the straight line through the plotted points to cross the axes at points other than the origin. To see if there was any serious inaccuracy in assuming that the line passed through the origin, the mathematically most probable line through the plotted points was found by the method of least squares. The result (shown by the broken line in Figure 1), starts a little above the origin, but in the main body of the curve varies only slightly in its values from that through the origin. The equations for these lines may be expressed as follows:

Assumed line (solid line): $Y = 0.152 X$.

Most probable line (broken line): $Y = 0.144 X + 0.13$.

Plainly the adoption of the simpler form, the line passing through the origin, does not introduce any error which is not well within the limit

of the accuracy of the data. There is some tendency for the line through the origin to become a flat curve, convex upward, but this curvature is both slight and poorly defined in the case of the individual groups. It is obvious that the straight line is at least a close approximation, justifiable by its greater convenience.

Translating the bark-diameter ratios to a bark volume-tree volume relationship, for a number of sample trees, it is found that on the average 27 per cent of the total volume of the bole or 37 per cent of the wood itself is bark.

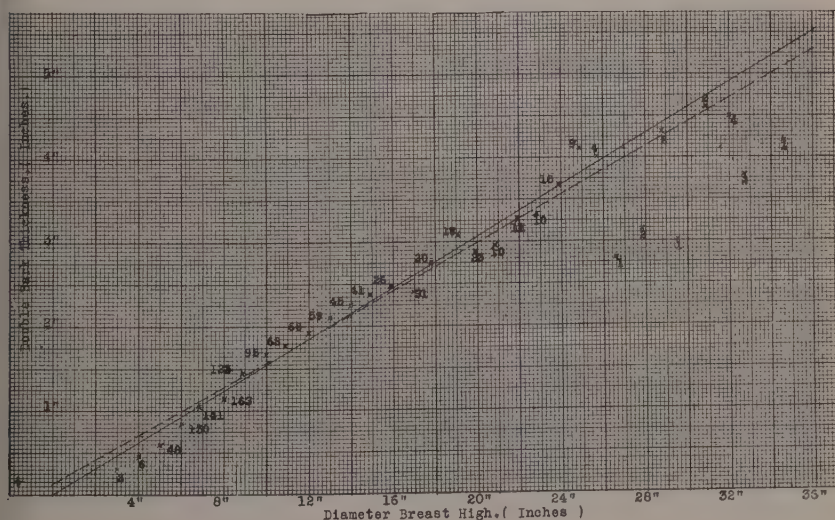


FIG. 1.—Relationship of bark to d.b.h. in redwood. Age of trees, 18 to 100 years. Number of trees, 1,176. Assumed line (solid line): bark thickness $= 0.152 \times$ diameter breast high. Most probable line (broken line): bark thickness $= 0.144 \times$ d.b.h. 0.13.

SUMMARY

1. In redwood the ratio between bark thickness and diameter outside bark, at any given point, is practically a constant for any group of trees.
2. For redwood under 100 years old and for a wide range of localities this ratio averages 15 per cent at breast height.
3. The ratio of bark to diameter decreases at a fairly regular rate at higher points on the tree (from 15 per cent at d. b. h. to 10 per cent at three-fourths total height).

4. This relationship does not appear to be affected by locality, site, or crown class, or even with increasing age up to 100 years.

5. The percentage of bark is lowered to about 13 per cent in the case of virgin timber.

6. The bark volume is 27 per cent of the total volume of the bole, or 37 per cent of the wood volume (in cubic feet), figured from the ground to the tip.

ACKNOWLEDGMENT.—This analysis is the result of a study made under the guidance of Professor Donald Bruce, of the University of California Forest School, whose friendly criticisms and editing were of great assistance in completing this paper.—J. E. P. JR.

NOTES FROM THE WHITE PINE COUNTRY

BY AUSTIN CARY

U. S. Forest Service

A. White Pine Seed Years in Relation to Reproduction of Cut-over Lands

Receipt of No. 6 of the series of bulletins from the Harvard Forest at Petersham, in which New England men must be taking so much satisfaction and pride even, reminds me of a set of observations made in southwestern Maine that tallies perfectly with the conclusions reached at Petersham on the matter of white pine seed years in relation to reproduction of cut-over territory.

York County, Maine, has been a pine-producing country for nearly 300 years. It has always produced some oak, too, and along with that it naturally has some other hardwoods. But pine makes up the bulk of the timber today; in fact, as near as appears from such history as has come to hand, it is much more prominent now in relation to hardwoods than it was in the native forest. Silvically, the two appear to be pretty nearly on a level, however. A crop of one type has been followed frequently by one of the other; as the two grow up together it is not difficult to tip the balance between them. This territory in a general way, therefore, as near as I understand, falls between the two types of land into which Prof. Fisher divides the region about him—the loamy hardwood soils of his own town and the sandy areas, naturally maintaining pine growth, that make up much of the town of Winchendon.

So much by way of local setting, while on the other side the noting of two facts may be required for the full understanding of some readers: first, that 1920 was a heavy seed year for white pine in New England; and, second, that Prof. Fisher has been telling us for some years that the date of cutting in relation to seed years greatly affects the type of reproduction.

Friends of mine, Messrs. Deering and Bradbury, at Hollis, lumbermen but interested in everything from the field of forestry that touches them, cut lots of well-developed pine mixed with some hardwoods, one each in the winter of 1919-20, 1920-21, and 1921-22. The chance to

observe reproduction in relation to the seed year was obvious, and it was utilized. The first lot cut is now growing up to hardwoods, only occasional young pines being found in it. The lot cut the next winter, when the seed was on the ground, is now thick in young pine, thicker than need be. As for the third, in the fall of 1921 we went over it, finding it to have reproduced fully. At the present time, however, reproduction is far less satisfactory on this lot than on the preceding. Rooting up by the logging and smothering under slash piles easily accounts for a part of that, but did not seem to entirely do so. Prof. Fisher, asked his idea on the subject, said he thought the *Hylobius* beetles accounted for it, that 2-year-old pine seedlings in the summer of 1922 would be nuts for them.

It may be worth while also to put on record a little happening in the same line that came off this last fall. The Dupont Powder Company, operating chiefly in Cumberland County, Maine, is getting interested in the growing of pine timber and one day in September last I went over a lot of some 500 acres cut by them in 1918 to 1922 with their general superintendent and two of their woodsmen. They wanted reproduction; had planted some already and expected to do more; I had this other matter in mind.

When we started, and as we went over the lot, I asked them particularly to let me know when we got to the ground cut over in the fall and winter of 1920-21. The reason why was evident enough to them when we got there; that ground was beautifully stocked with pine. True, some cleaning may be necessary before they can look for the fine, full stand they as well as technical men know how to appreciate, but as much or more of that will also be required wherever they plant the land. Prof. Fisher is right, too, in some broad statements he has made. Before we have any business to set up to tell people how to handle their land for forest production, we ought to know how that land and the growth on it act in detail.

B. A Profitable Thinning

This was carried out on the land of W. B. Deering, of Hollis, Maine, one of the two men above mentioned. He had done a little of it once before; thought there might be a good deal in it of value to him; was glad to try it out on a small scale accurately and under guidance and that the results should serve general purposes if it was in them to do that.

The stand chosen was white pine about 40 years old, nearly pure,

pasture growth originally, thick as is usual with timber of that age and origin in the locality, but of course not even. The trees were around 55 feet in total height and ran up to 13 inches in diameter, so it was a lot that could have been cut clean for market had the owner wished; in fact the area worked on had a stand around 30,000 to the acre. The trees 6 inches in diameter breast high and up that were cut in thinning were sawed for box lumber; the tops and smaller trees down to about 3 inches d. b. h. had good local market for firewood. Both sorts of material were hauled between 1 and 2 miles. I don't know how one well posted in silvical theory would designate the sort of thinning made; Mr. Deering and I marked to come out what we thought ought to come out, with a view to leaving the balance of the timber to grow 10 or 15 years and not with the idea of securing reproduction. Catch-as-catch-can thinning would perhaps describe it best; we don't ourselves feel sure that it is the best possible. This is true, however, that Mr. Deering, in view of the results as they stand today, financial and other, intends to go over his lands in that general fashion.

We thinned a quarter acre and staked out another alongside it that was left unthinned; capipered the trees and numbered with paint each one left standing; measured heights on each plot of a considerable number. Following are the results, in wood and in money, for the quarter acre thinned.

Product, $3\frac{1}{2}$ cords of firewood in sled lengths worth \$5 a cord, and 1,385 feet of round-edge box lumber worth \$25 a thousand; a total return of \$52.12. *Cost*, 3 man days' labor to cut and load; 2 days for team and driver; sawing at \$5 per thousand feet; a total cost of \$32.92. *Net return*, \$29.20.

That completes the record to date except to note that the trees came out and down easily and without causing damage—there was no real difficulty in the operation. Men from some other sections of the country, however, who may read this with care will be led to think pointedly of various things—markets close by, price had for small timber, of contrast in these respects with conditions in their own neighborhood. Conditions like that, as I see it, can't be helped; are not undesirable and do not need change, except as development of economic conditions naturally and gradually brings it. No need, then, for those men to worry or repine, or do anything else than meet as best they can the conditions with which they are actually confronted.

For New Englanders, however, and those in like circumstances, the inference is different, as indeed Mr. Cope in Maryland and certain foresters in other Eastern States have of late been demonstrating. All through central New England, for instance, are pine groves in shape very similar to that of Mr. Deering before his was touched, capable like his of yielding \$50 to \$100 net revenue an acre at the same time that they are put in shape to grow timber faster. In these circumstances the land owner who doesn't act is either blind to his own interest or slow, and of the forester, I think the same thing may be fairly said as respects his opportunity. That last, be it said, is double, for service both to himself and to others. For my part, it has long been a source of wonder and regret that many more men than there are were not in these thoroughly productive lines of work as a matter of plain business.

FARM FORESTRY EXTENSION¹

BY E. G. CHEYNEY

Professor of Forestry, University of Minnesota

Farm forestry extension was born at a meeting of the Northeastern Foresters at New Haven only a year ago. Fostered by the foresters and mothered by extension it grew with almost unbelievable vigor, and like all precocious children soon drew on itself the severe criticism of both branches of the family. But it is a question whether these criticisms are not really directed at the clothes rather than at the child itself.

It seems natural that the severest criticisms should have come from the foresters. They have brought up many popular babies in the past only to have them adopted by some new upstart organization just about the time that they were getting old enough to work for their father. And the fathers think that they have a grievance. This extension proposition looked to some of the State foresters like another kidnaping scheme, kidnaping of what they considered their most promising child.

But is it really a case of kidnaping? Or is it simply a case of child training? Even in the other previous cases it was not a total loss to forestry, in fact it is doubtful whether it was any loss at all, for the children always went on working for their fathers in their new home and made him new friends whom he could not otherwise have reached. For example, the use of the forests as a playground was first advocated in Minnesota by the State Forest Service, but when it was taken over by the 10,000 Lakes Association it received an impetus which the forester could not have given it. And at the same time the forester will gain thousands of backers through the work of the new organization.

The conservation of the forests as a home for game and fish has been advocated by the forester for years, with, in many cases, only questionable success. The child has now been raised high in the vigorous arms of the youthful Isaac Walton League, and who can say that they will not ultimately bring more strength to the forester in his

¹ Delivered before the annual meeting of the Society at Baltimore, December 28, 1923.

fight for the forests. They have thousands of backers whom the foresters could never have touched and the conservation of our forests must inevitably be the keystone of their arch. Can we truthfully say that the child has been lost to forestry? They have both helped the State forester immeasurably.

But the development of farm forestry through the machinery of agricultural extension seems to differ from the other kidnaping schemes. In the case of the other thefts, the new organization had an axe to grind and the benefits of the forests were only secondary, but none the less real, for that reason. Has Agricultural Extension an axe to grind? If it has, it must be a very small hatchet indeed.

Just what is the situation? Let us analyze conditions as they existed when this plan was first proposed.

The primary duty of a State forester is to build up and manage the forests of the State, whether private or public. All of the other duties are ultimately secondary. Only for this primary work is a man of his wide experience and thorough training needed. Much smaller men could manage the other phases of the work. In order to practice forestry, there must be a large area of forest. A woodlot is not a forest.

But in order to carry out his primary object, he had to have the support of public opinion. Ninety-nine per cent of the people know nothing of forestry or the duties of a state forester. They had to be interested and educated. Something tangible had to be accomplished. Fire fighting and tree planting were something the people could see, and especially if they were on their own land. The foresters seized that opportunity to get forestry into the limelight and gain a following.

They soon found that they had taken up a tremendous burden. Instead of being side lines, these things grew to be paramount issues and to obscure the main object. The tail was wagging the dog. Instead of building up the future timber supply of the State on a big scale on the unused waste lands, they were exhausting their energy in giving advice to farmers on petty woodlots and chasing fires on private lands which the owners wanted to burn. These were necessary measures at the time, may still be necessary in many cases, but it should be kept in mind that they are only expedients and that the real work is still waiting.

Naturally the necessity for educating the public led the State forester to do a great deal of what he calls extension work. In most cases it was not true extension work. Publicity would be a better term.

It consisted mostly of lectures, newspaper articles, and correspondence. He, himself, was overworked and confronted with a double problem: more work than he could do under any conditions, and lack of money to do it with.

The result was that the main object in many instances became buried in a mass of details—details essential to the State forester's support, but subsidiary just the same, and to be got rid of as soon as opportunity offered. His functions are administrative and regulatory, not educational.

He really did not have any time to do extension work, and yet he saw the possibility of introducing a large number of small owners to forestry ideas through helping them with their woodlots, and hoped in that way to get their support for his main project. He could hardly afford to neglect such a promising lead. Nor, in most cases, could he afford to carry it out as it deserved.

And what was the situation in Agricultural Extension? For many years the different divisions in Agriculture (Agronomy, Horticulture, Farm Management, Animal Husbandry, etc.) had each been carrying on extension work in the same haphazard way as the State foresters. Lectures, articles, letters, and occasionally a demonstration. The work was weak because the methods were poor and the object uncertain.

Finally the futility of such work was recognized and an Agricultural Extension Division was established for the administration of the extension work of all departments. A technique was developed and an organization perfected. This purpose was to demonstrate things to the farmers, either singly or in groups, by well-developed and thoroughly proven methods, and to follow up the work in such a way that their demonstration would be taken to heart.

There is more in extension than the mere segregation of the old extension work; there is a technique and an organization which gets results.

The advantages of the new system were quickly recognized by all the divisions. It relieved them of a work which they had been poorly fitted to do and made that work more effective. Experts in the various lines were put at the service of the extension division and the work went on apace. Through the county agents community leaders and suitable cooperators were located, appointments were made and the experts in the different lines were brought into contact with those who could appreciate help. Here is a chance for the forester to get rid

of a secondary job he has neither the time nor the organization to carry out.

Such contact as this would undoubtedly be of almost unlimited value to the forester in handling his extension work. He realizes that, but he is afraid that the Agricultural Extension Division will get the credit and the forester will be forgotten.

Would all of the agricultural divisions have surrendered their extension work so cheerfully if that had been the case? A manufacturing plant turns over its advertising to a well established agency. The agency puts all of the material before the public and brings the people in contact with the product of the factory. But how many people ever know the name of the agency? It is the product only that they know and the only thing in which they are interested.

The extension division should be in exactly the same position as the advertising agency. In fact the extension division is the advertising agency for the things which the other divisions have to sell. It has nothing of its own to sell, not a single commodity. The man who goes to a chatauqua meeting and hears a brilliant talk on foreign trade may be intensely interested in foreign trade from that time on, but he will seldom if ever even know the name of the lyceum bureau which is managing the lecturer, or think of its existence.

Isn't it possible that the forester has made a bugaboo out of the extension division and attributed to it undesirable qualities which it does not have? Are not the shortcomings which the foresters condemn really shortcomings of the form of organization in their particular States rather than shortcomings of the principles involved?

It seems likely that both the pros and the antis have gone a little too far and have been a little too radical. In some cases extension men have been put in the field without consulting the State forester and without giving him any say in the policy to be followed or the material to be distributed. In some States the extension forester roams around the State on a mission entirely unfamiliar to the State forester. The forester does not even know his beat. The result is bound to be confusion and duplication.

That is an entirely unfortunate situation, but it is not the fault of the extension principle. It is partly the fault of poor organization and partly the fault of the State forester for not insisting that he be allowed to get on the band wagon and ride with the others.

As I have said before, the work of the Extension Division is the development of technique and an organization to establish and maintain intimate contacts with the farmers throughout the State. The subject-matter should be supplied by the divisions organized for that purpose. Thus, the extension expert in horticulture should also be a member of the horticultural division, should keep in close touch with that division (office with it if possible) and be responsible to it for his policy and the material which he distributes.

Where there are two subject-matter departments involved, such as the division of forestry in the college of agriculture and the State forester, the extension man should without doubt be responsible to both of them. This should not be difficult as the two must agree in policy and subject matter if only for decency's sake. Where there is no forestry in the agricultural college, the State forester alone should be responsible for the subject matter. These are fundamentals in organization and can not be neglected without duplication and loss of efficiency.

In most cases the Extension Division will not be over eager to take on this new work. They are overloaded, pressure is continually being brought to bear upon them to extend their activities in many directions, and they are still suffering from a post-war cut in appropriations. In many instances, it will be necessary for someone else to furnish them with the money. Usually they will willingly take on work, if they can get the means, because they are coming to recognize the farm forest as an important part of the farm. Their county agents are calling for help on it.

The forester is the real beneficiary from such a combination. If he has \$4,000 and has the choice of hiring an extension man of his own or of turning the money over to the Extension Division for the employment of an extension expert in farm forestry—and remember that no extension plan has been considered for anything *but* farm forestry—he will be wise if he does the latter, provided the local organization is right.

In the former case, he will be confined to the work of his own rangers and in many States they are located in only part of the State. He will from time to time be confronted with pressing problems in the line of fire protection, planting and the like, and he will inevitably call the extension man away from his work to attend to them. The order and the system of the work is destroyed.

Place his man in the extension division and he steps into contact with all the leading farmers in the State through the county agents; he has additional contact through the rangers. He is brought into contact with other men engaged in the same kind of work and gets a stimulus from them. His fellow workers, including the county agents, will develop an interest in his work. And every man he interests in forestry becomes a new listener and a new support for the State forester. At the same time it gives the forester a chance to shoulder onto someone else some of the secondary jobs which have burdened him in the past.

The forester has lived and worked too long in magnificent isolation. He has said: "My work is different. No one but myself can understand it or do any part of it." Maybe that is true, but there are others who would be interested in it if they were permitted to become so. Nearly all of the great body of agricultural research workers could be interested in it by such a scheme as this. Their moral support would be tremendous and their actual help not inconsiderable. This is a good opportunity for the forester to show that he is human and at the same time to tremendously increase his influence.

A FORESTER'S CODE OF ETHICS¹

BY THEODORE S. WOOLSEY, JR.

Consulting Forester and Member of the Society's Committee on Ethics

The remarkable ethical movement of our generation is part of the adjustment of the race to the particular kind of world in which we live. We have been learning that there are laws of ethics, as well as of physics and biology, and that they operate in much the same way. All conduct is the cause of certain effects. Practices are ethical, if in the long run they make for the well-being of the human species and for normal human relations. If there is friction and social loss, it is a sign of unethical practices.

Each professional or trade group has its own problems of ethics. The conduct of its members must be judged by its consequences, to the group and to the community as a whole. In the course of time there develops a more or less definite standard of professional practice, which has the backing of experience and public sentiment. But there is always a fringe of unscrupulous men who are ready to disregard this standard, for the sake of immediate gain. Unethical practices are not only a menace to society. They jeopardize the standing of that profession as a whole and tend to lower the value of its members' service. The enforcement of the standard is a matter of self preservation.

The written code has been found a most efficient means of accomplishing this result. It makes the standard definite enough to serve as a basis for disciplinary action. It educates sentiment within the profession, particularly among the younger men who have entered or are about to enter. It puts the profession in the proper light with the public which employs it, and enlists the aid of that public in enforcing the standard. To quote the preamble of the Code of Ethics of the Gas Products Association: "The ideals of men best project themselves into reality when crystallized into written documents. In every line of human activity, a united written expression of what is

¹ Presented at the annual meeting of the Society at Baltimore, December 28, 1923.

best for the common good becomes a strong force for progress. The mere expression clarifies the general sentiment."²

It seems desirable that the Society of American Foresters should adopt a written code of ethics at the earliest opportunity. We must keep up with the ethical standards of other professions. If it is granted that a foresters' code is needed, how shall we set about getting it?

The committee, already appointed by our president, should be continued another year with instructions to report a code at the next meeting of the Society. In the meantime a draft of the proposed code should be sent to all sections for criticism and amendment.

Owing to the inability of the committee to get together and report I have been asked to submit a tentative code draft as the first step toward getting the matter started.³

1. The forester, in his professional work, acts as an agent or trustee, and will show fidelity to his clients.

2. He will be faithful to the ideal of a reasonable forest practice, as determined by local conditions.

3. He will inform a client of any business connections, interests, or affiliations which might influence his judgment or impair the disinterested quality of his service.

4. For a particular service, he will accept compensation, financial or otherwise, from one source only, and refuse commissions or trade discounts.

5. He should avoid controversy with clients regarding compensation, so far as compatible with self-respect and the forester's right to receive reasonable compensation for his professional services.

6. Forestry is a profession and not a trade, and charges should be based on what the forester considers a just and adequate return for the time spent and the value of the service rendered, rather than on the financial ability of his client.

7. The forester will not associate himself with, or allow the use of his name by, an enterprise of questionable character or one that is working against the best interests of the community.

8. He will not resort to undignified or self-laudatory advertising. He may state briefly the lines of work in which he has had experience, and enumerate responsible positions which he has held and give his references.

² Edgar L. Heermance, a student of this movement, is authority for this introduction.

³ Modeled after "The Code of Ethics for All Engineers," and other codes.

9. He will not, directly, or indirectly, encroach upon the reputation, prospects, or business of another member of the profession. Ordinarily the inefficient work of another consulting forester should not be criticised unless the client especially calls for this information. Corrupt and unethical conduct in the profession, however, will be exposed by the forester without fear or favor.

10. He will cooperate in upbuilding the forestry profession by exchanging general information and experience with his fellow foresters, and by making available, as soon as practicable, any technical discovery of value to the science of forestry.

11. He will fulfill his responsibility to the community by spreading the knowledge of forest conservation and its underlying principles.

12. The forester when in public service will be courteous, industrious, impartial and scrupulous. He will resist the misuse or waste of public property. He will not permit violations of the law.

RECENT DEVELOPMENTS IN LUMBER DISTRIBUTION¹

BY NELSON COURTLANDT BROWN

Professor of Forest Utilization, New York State College of Forestry.

Three unforeseen and significant developments have occurred since the great war which are worthy of the attention of those interested in forest economics and the present and future trends of lumber distribution. Briefly, these developments may be summarized as follows:

(1) The rapid increase in cargo and parcel lot shipments from the North Pacific coast to the Atlantic seaboard.

(2) The increase in wooden construction in California, particularly in home building in the southern counties.

(3) The Japanese earthquake and its resultant demands for American lumber.

For some time after the opening of the Panama Canal there were relatively negligible quantities of lumber shipped by water from the North Pacific points to the great lumber markets of the Atlantic seaboard. After the world war, however, and the return to private construction activities and a release of large amounts of ocean carriers for commercial shipping, shipments of Douglas fir and associated woods began to come to the Atlantic ports in rapidly increasing quantities. This was due to keen competition among the shipping companies for the business, sales pressure in the Eastern markets and low competitive prices.

At first, fir and western hemlock had to be offered at prices considerably below those for such competitive woods as southern yellow pine, North Carolina pine, Adirondack, Canadian, and West Virginia spruce, Pennsylvania hemlock, and other woods.

The figures illustrating this movement are most interesting. They show that shipments amounted to 48,000,000 board feet in 1919, increased to 211,000,000 feet in 1921, to 665,000,000 feet in 1922 and approximately 1,500,000,000 feet in 1923. At first, Douglas fir was sold in competition with southern yellow pine with extreme difficulty even at a price sacrifice. Trade prejudice among both the wholesalers

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and retailers was very strong and even those willing to try it at first found difficulty in disposing of it to contractors and other ultimate consumers of small and large dimension material and timbers which with the roofers or No. 2 common stock constitute the big business along the great Atlantic seaboard markets. Even today fir timbers and dimension do not command the same price as do the same sizes and quality in longleaf pine.

The great impetus, however, to the increased flow of West coast woods to Eastern markets was given by low ocean rates in comparison with the prevailing rail rates. At a 90 cent rail rate from the coast shipping points to New York, green rough fir, weighing 3,300 pounds per 1,000 board feet, cost \$29.70 for freight alone. As contrasted with this, ocean freight rates which held at first at \$20 to \$25 per 1,000 board feet gradually dropped to \$12 to \$15 per 1,000 feet and considerable lumber has recently been moved for even as low as \$8 to \$10 per 1,000 feet under special conditions, such as distress space, deck loads, etc.

These attractive rates meant that lumber could be brought to the Eastern markets from the far West as cheaply as from many nearby points in New York, New England, and Pennsylvania by rail. West coast lumber has even been transhipped by canal to inland points, such as Syracuse and Buffalo. Recently a cargo of lumber was shipped from the Northwest via the Panama Canal to Chicago. This situation has meant a serious loss in revenue to the transcontinental railways which had enjoyed the long lumber haul as an important and profitable part of their traffic.

It is possible that a revision in competitive rates as between rail and ocean hauls may disturb the trend of this situation, but rail rates are regulated by a government commission and are slow in being changed, whereas the supply of and demand for ocean freight space determine water rates and may change from day to day.

It is believed that the waning supply of southern yellow pine has had relatively little part in the development of the sales of West coast woods on the Eastern markets. Moreover, the gradual elimination of the South as a great national source of supply is being delayed by these developments, and conversely the reduction of the virgin sources of supply in the West is being hurried at a rate faster than seemed likely a few years ago.

The unabated and ever increasing demand for lumber in southern California continues. The writer estimates that in 1923 about one-

sixtieth of the country's population consumed about one-fifteenth of the nation's lumber production. Although California has recently become one of the leading States in lumber consumption, there is no question but that wooden construction is more active today in southern California, and doubtless has been for the past four years, than in any other section of the country. The movement from northern Pacific mills to the southern California points has been steadily advancing, both by rail and water, since 1919, whereas the remainder of the country has been undergoing varying degrees of prosperity and depression and its concomitant waves of building activity. The water movement from Washington and Oregon cargo mills to California ports increased from about 850,000,000 feet in 1919 to over 1,500,000,000 feet in 1923.

The Japanese situation is almost too well known to justify comment. Varying estimates of from 3,000,000,000 to 6,000,000,000 feet have been made of the quantity to satisfy the reconstruction requirements. The time over which the shipments are to be spread is another unanswered and important question, but it is likely that it will be spread over as long a time as is reasonably possible in order to facilitate financing and to prevent the effect on prices that this large purchasing power would ordinarily have. Japan took 590,000,000 board feet from the United States in 1922, as compared with only 39,000,000 feet in 1919, and 78,000,000 in 1920.

What the significance of these great developments in our national supply and distribution of lumber is going to be can doubtless be best measured in retrospect but they are worthy of thoughtful consideration and careful study by us all.

CRUISING FOR QUICK VALUES IN THE NORTHEAST¹

BY JAMES W. SEWALL

Forest Engineer, Oldtown, Maine.

Any work we are called upon to do is controlled in method and thoroughness by the business reasons calling for it. Time and cost per acre or square mile, either separately or together, determine the necessity for reconnaissance cruises as opposed to detailed ones, as well as the thoroughness of the reconnaissance. Undoubtedly everyone of us who passes on land values for purposes of purchase has been compelled to give quick, and sometimes inadequately supported, judgments, on which large sums of money have been invested or withheld. None like to do this, but the contingencies of the moment drive us.

One evening about 8 o'clock my house telephone rang. Boston was calling. Could I report on the advisability of purchase, on certain terms, of 80,000 acres in the Gaspé country, and have the information in by the middle of the following week? Can you give us more time, I ask. The answer is no—an expiring option—get what you can—wire it in. We arrange a code.

Two of our cruisers and myself were away, with equipment, on the 4 o'clock train next morning. We arrived at destination in time to allow three days' travel on the lands, fortunately situated in high country over which wide views could be obtained. It being warm weather we dispensed with outfit and spread out separately over the limit, meeting on the night of the third day. We were satisfied as to amount of timber. We had discovered, however, that the property had been cruised in considerable detail several times before and quite recently. The price seemed low. What was wrong? It was decided that two of us follow down the river which drained the area and the other strike out to the sea-coast village where the river emptied, the latter in search of any quietly picked-up information possible.

When we met, the man at the village had the story. Logs could be run down easily enough, but there was no place to stop them except in the privileges owned or controlled by certain other and necessarily

¹ Delivered before the annual meeting of the Society at Baltimore, December 27, 1923.

antagonistic interests. To be sure this difficulty could be solved by construction of numerous piers, and purchase of sundry undesirable property along with that, and even then the site would be badly exposed. Our 80,000 acres fell by the wayside, and our code telegram said, "No good."

Yet here was a case, where driven by the exigencies of time, we might well have wired in that the timber was there; the trade would have been made accordingly. Only the best of luck in weather, travel, and rumor gave us time to investigate the ultimate possibility, and thereby make the right decision.

Another instance of an entirely different sort occurs to me. I met several men in a private room of a certain powerful bank. Loans on timberland had been made. Unfortunate management combined with general business calamity had compelled liquidation. This timberland was the principal asset. How much lumber or pulpwood existed on the lands nobody seemed to know. A purchase offer had been made, but the price seemed low.

The lands were broken into many comparatively small lots. The market made utilization possible both for softwoods and hardwoods. But as varying diameter classes differentiated prices sharply, absolute reconnaissance as final determination of quantity was unsafe. But was the land worth a careful and detailed cruise? It had been culled over for sawlogs for years; some fires had swept it; and the bank had all the money invested in it that it wished—and then some.

So a preliminary investigation was decided upon. From that the information as to what to do next should be had. If a detailed cruise and inventory is advised, what will it cost?

I sent onto the lands a cruiser who is particularly experienced in operating and driving costs. A network of roads allowed him to use a Ford car, with very little travel on foot. While the area was not large, only 40,000 acres, its broken up condition made it extend some 40 miles in length. In about 10 days' time we were able to report that there were considerable assets of timber and pulpwood, with excellent opportunity for operating, driving, holding, and rail or water shipment. We advised a sufficiently detailed cruise to arrive at a reasonably accurate inventory. This was done, and the land eventually sold for considerably more than the first offers.

This was a case where even superficial reconnaissance was warranted. General condition was to be passed upon, not actual quantities. And policy as to future would not be gone into blindfold.

Finally, last year, a New York house called us in. A promoter had placed before them an area of over 2,000,000 acres in Newfoundland. Stumpage values and dues were held exceedingly low. But the proposed development was a pioneer one. A mill must be erected, water power developed, shipping facilities acquired. A vast amount of pulpwood must be seen before the venture could be attractive.

The minimum quantity of wood required was decided on. Two reports by two different cruisers were shown us, each stating quantities far above this minimum. Our instructions were brief. Check these cruises up to the point of finding our requirement; spend what time you need, and as little money as possible.

One man only was detailed for this work. Choosing certain areas discussed by the former cruises he traveled intensively enough to draw the conclusion that their figures were vastly exaggerated. After that he continued going over the greater part of the area, seeing sufficient of the forest to base a general average acre upon. As a matter of fact logging conditions, hard footing for horses, and bleak plains down which the winter winds would drive the snow, militated against the proposition. The cost of this cruise was very little per acre, only a fraction of a cent, but it solved the problem.

From the above examples, and they are but few among many, you can judge that the fate of a reconnaissance cruiser, if he be troubled with the desire for accuracy, is not always happy. I really think that there are no other investments in the world into which wise and foreseeing men will heap great sums of money on so little absolute information as into timberlands. This is not true of all, but is true of many, and I suppose is a hark-back to the days of low stumpage. The tendency is gradually changing, and more detail being allowed, more dependence being placed on actual measurements and samples, but in many instances we have had considerable argument trying to guard our clients' own interests.

I have had it stated to me that the peculiar adaptability of the reconnaissance cruiser almost always fails to exist in the mental mechanism of so-called detail men; that the two gifts do not march together. My own experience teaches that this is not true. The reason for the belief is undoubtedly because the first attempts of theoretically trained men to do quick cruising were full of blunders; it was only fair to expect this, because in most instances these men were not experienced either in woodcraft or in operating. Their work stacked up poorly

beside that of the old, wise explorer, familiar with his timber and region, and drilled with many years' rough experience in his calling.

By now, however, the one-time greenhorn has also been through the mill. On top of his training he has had opportunity to achieve the same learning as the land-looker. And I have found that he is just as valuable a man, with usually a more comprehensive grasp of entire situations.

Methods of reconnaissance vary much with individuals. When several men are working together it is of course best, although not absolutely necessary, that they adopt a common system. Our usual attempt is judgment of stand per acre, checked as often as possible by actual scaling up of average samples. An adaptation of this method which we have used quite successfully is to travel along recorded general courses by time measure; we allow in ordinary timber a speed of one mile per hour; by setting down the stand per acre for each 15-minute period we really obtain numerous sample acres from which the stand per acre for the day or tract may be obtained. The work of several cruisers may be thrown together. I fully realize how crude this method must seem, but often it has been the best that we could do in the time allotted for the job, and sometimes has been even too elaborate to employ.

When this latter contingency arises we are driven into old-fashioned wandering and look offs, and to absolute visual judgment as to stand. Such work can not be called scientific. It is an art acquired by experience only, and nobody can tell anybody else just how to get it. This is true, however: given a single product unit, few species and diameter classes, and such judgment should check out fairly well.

Obtaining forested area is of course essential. One cruise of some 154,000 acres which we made recently, the seller honestly believed that only one-third of his land was burned or waste; our figures agreed with his stand per acre closely, but differed in finding two-thirds of the area non-forested.

Where maps of even comparative reliability exist total areas may be taken from them. Percentage of waste may then be obtained from lines of travel, or from rough sketching in on field maps, and graphic throw-out. Some element of judgment and woodsmanship enters here.

Finally it must always be remembered that quantities of timber or pulpwood are no more important than conditions of operating, transportation, and market. You must pass on costs of converting standing trees to available lumber or wood. Local men will often help in this, but the ultimate decision on which you client makes or loses at the beginning of his venture lies with you.

GIPSY MOTH SITUATION AS IT APPLIES TO NEW YORK ¹

By H. L. McINTYRE

Supervisor, Gipsy Moth Control, State Conservation Commission, Albany, N. Y.

The western spread of the gipsy moth in New England during the past few years was felt to constitute such a menace to New York State that a meeting of agricultural officials and experts from Canada and the New England States, the United States Department of Agriculture, New York, and New Jersey, was held at Albany, N. Y., November 16, 1922, for the purpose of considering the most feasible action to prevent the further spread of this insect.

The unanimous decision reached at this conference was that a control zone, termed a "barrier zone," be established in New York and New England, running south from the Canadian border, east of Lake Champlain in Vermont and east of the Hudson River through New York State, from the southern end of Lake Champlain to a point south of the Massachusetts and Connecticut boundary, thence southeasterly through Connecticut to Long Island Sound.

When we take into consideration the partial barrier afforded by Lake Champlain on the west and Long Island Sound on the south, this area was considered the most practical in which such a zone could be established, and is the shortest line in which such a problem can be undertaken.

The consensus of opinion of the conference was also that New York State should appropriate \$150,000, which it was believed would cover the cost of the necessary work to establish such a zone in the section of the area coming in New York State.

A bill requesting \$150,000 for this work was prepared and submitted to the legislature. Their prompt action in passing the bill as presented is to be highly commended. The appropriation became available March 15, 1923, but this was too late a date to attempt training men for field work, on account of the fact that the gipsy moth egg masses frequently hatch during the latter part of April.

¹ Delivered before the annual meeting of the Society at Baltimore, December 28, 1923.

Through the courtesy of the United States Department of Agriculture, a few crews of their trained men were transferred to the New York work. During the short period of time that it was possible for these crews to efficiently perform scouting work, small gipsy moth infestations were located in two counties, namely, Rensselaer, which is east of Albany, and in Dutchess, east of Poughkeepsie.

During the summer months these men were engaged in making inspections in the Adirondack and Catskill mountain sections in the vicinity of summer resorts, hotels, camping places, garages, amusement parks and other places frequented by tourists. This resulted in one infestation being found in an amusement park in Albany.

Quite an extensive experiment was also conducted in an endeavor to secure further information on wind currents, which are an important factor in gipsy moth spread. The records secured on wind currents this year indicate that the possibility of spread through this means is not as favorable in the Hudson Valley as in the Deerfield and Connecticut valleys in New England. Further experiment along this line is necessary before any definite conclusions can be reached.

A strenuous effort has been made this fall to organize a force for field work by training men who are residents of the area where the work is being conducted. It is necessary that these men have some training in the gipsy moth work, before giving them employment. Such training must be secured in a section infested by the gipsy moth.

Quite encouraging results have been secured, both in organizing a force adapted to gipsy moth work and in the area covered. At the present time we have about 150 men engaged in scouting work, and have scouted about one-third of the zone area in New York State. This work has resulted in locating two small gipsy moth infestations, one at Berlin and the other at North Greenbush, both in Rensselaer County, the former about 10 miles, the latter about 25 miles directly east of Albany.

The fact that gipsy moth infestations have already been located in New York indicates that New York State's attempt to prevent this serious insect enemy of shade, fruit and forest trees from becoming established within its borders is a timely one.

The chief feature of the barrier zone work will be repeated yearly examinations of the zone and adjacent area and extermination of such colonies as may be found.

It is not from lack of effort or knowledge of how to best carry on gipsy moth suppression work on the part of the United States Department of Agriculture or the New England States, that the size of the infested area has increased about 28,000 square miles during the past seventeen years. The first Federal appropriation for gipsy moth work became available July 1, 1906. At that time the infested area in New England comprised about 2,500 square miles. They have continuously, since that date, kept up a sincere and strenuous battle and have secured the cooperation of the New England States in an effort to keep this insect in check. In spite of this fact the size of the infested area has continued to increase until at the present time it exceeds 30,000 square miles.

If some of the information secured years ago had been fully appreciated and put into practice throughout the country, a great portion of the United States would be today practically immune from infestation. Unfortunately little attempt has been made outside of the infested area to put into practice, in the slightest degree, any of the methods advocated to prepare the country ahead of the gipsy moth, so that it would be as resistant as possible to infestation. It seems as though it has always been a case of waiting until the horse was stolen to lock the door.

There is another very gratifying condition in New York State's attempt to keep the gipsy moth from permanently crossing its borders, that is, for the seventeen consecutive years that the gipsy moth work has been carried on, this is the first attempt to take up the work in the section outside of the infested area in an endeavor to prepare a zone that will be as resistant as possible to the threatened invasion.

The task is a gigantic one, especially so when taking into consideration that some of the largest isolated infestations ever found in New England have been found this year in towns adjacent to the New York border.

It will probably be well to briefly mention here a few more of the important factors in connection with this barrier zone.

The proposed area consists of about 3,500 square miles.

The general type of country in this section is rather open, the percentage of wooded area per square mile being much less than in any section in the infested area in New England, and if not found generally infested is apparently a favorable location to carry out the proposed plan. There is, however, in the area an abundance of favorable gipsy

moth food plants, both of individual trees and small wooded areas. The occasions are very rare in New England where gipsy moth infestations have been found in wood land until the infestations in orchards or isolated or lone pasture trees were found to be quite general. These important sources first susceptible to infestation must be removed if success is to be attained.

The reference to orchards does not apply to the orchard that is properly cared for, but to the abandoned orchard and isolated apple trees that are not worth spraying and which are usually found to be full of cavities, a breeding place for insects, a menace to their surroundings and valueless, except for firewood.

The process of eliminating the most important locations for gipsy moth to become established is in itself a big undertaking, and one in which we must have the cooperation of our citizens, especially of those in the area in which the work is to be conducted, or now known as danger points of invasion.

The most important known factor in the dispersion of the gipsy moth is wind-spread. The newly hatched caterpillar is covered with rather peculiar hairs, which makes it very buoyant. It is a common habit of this small caterpillar to spin silken threads, which are attached to the tree, and in this way lower itself to the ground. It is during this process of webbing from tree to ground that spread by wind occurs. Climatic conditions are quite a controlling factor in wind dispersion, as records do not indicate any activity from the young caterpillars with a temperature below 60° F. With a higher temperature and quite strong winds, spread for long distances is possible. Absolute records of from twelve to twenty miles spread of the first stage gipsy moth caterpillar by the wind under favorable conditions, have been secured.

Realizing these conditions, and also taking into consideration the fact that several large colonies have been located less than five miles from the New York border, it can readily be seen that the most strenuous battle that has ever been waged against this insect in this country must be fought, if its further spread is to be prevented.

The results of our endeavors depend considerably upon the cooperation extended, especially in the area in which the work is being conducted, and the New England area adjacent to our border. Individual cooperation by the property owners in the zone can be extended without cost to them by assisting in removing favored trees at important points where infestations are liable to become established. Co-

operation in New England is extremely important, both by the United States Department of Agriculture and the New England States.

The infestation on our eastern border must be kept down below the danger point of wind-spread. Federal funds must be granted to permit carrying on an extensive suppression campaign in a strip extending from the Canadian border to Long Island Sound, at least twenty-five miles wide in the southern section and forty miles wide in the northern section. The essential factor in having Federal work extend over a wider area in the northern section is due to the fact that the Adirondack Mountain section of New York is directly west of the northern New England area.

The Adirondack Mountain section is a vast wooded area of over 5 million acres. The possibility of making a systematic examination of such an area is rather limited. The value of essential cooperation is probably not very frequently considered by the individual who receives the benefit of the work that is done, or even by the individual who extends what cooperation he can.

The following figures show the cost of the gipsy moth work in a few communities in New England, and undoubtedly will indicate that the old saying is a true one: "An ounce of prevention is worth a pound of cure." For lack of immediate access to more recent figures, I will use data published by A. F. Burgess, in charge of gipsy moth work, U. S. Department of Agriculture, Bureau of Entomology, 1916, Bulletin No. 706.

Area in square miles	Population	Towns and owners expenditures			Additional State aid
		Amount	\$1,000 valuation	Per capita	
19	829	\$968.31	\$1.31	\$1.17	\$2,207.90
7	7,090	3,898.83	.64	.55	1,081.32
32	145,986	17,190.77	.09	.12	726.93

These figures show the actual expenditure on gipsy moth suppression work for ornamental park, fruit and shade tree protection in two small towns and one city. To these costs should be added not less than 35 per cent to cover the increased cost of material and labor since these figures were compiled. The cost of woodland gipsy moth work greatly exceeds the figures quoted above. The cost of only one activity in

suppression work (spraying) cannot be properly done for less than \$14 per acre.

If the gipsy moth becomes firmly established in New York State it will be found that the figures quoted are very conservative; also, that an amount not less per township will be expended in a like area, whether carried on as a State project or not.

We are hoping to attain success in our undertaking. It is essential to every citizen in New York and adjacent States that the gipsy moth be kept within the confines of the territory it now covers. Our program on reforestation and conservation must not be handicapped, if it is possible to prevent it. More information on injurious insects and diseases of tree life by the individual would be an important factor in their control. The day that compulsory teaching on this subject in our grade schools is put into effect will mark a long stride in conservation.

When we take into consideration the number of people who, during the summer season, visit our city and woodland parks in search of shade from the sweltering rays of the sun, or shelter from a storm, and how few of these visitors can name the species of the trees that shelter them, the advisability of education on the subject cannot be too strongly urged.

Our aim in conservation is to impress upon our citizens the absolute necessity of protecting our forest, shade, and fruit trees, and hope the word in the well-known verse "woodsman" will be meant to signify "insects," and the sentiment of every citizen of New York State, especially those of the coming generation, is expressed in—

"Insects, spare those trees,
Touch not a single bough,
In youth they sheltered me,
I will protect them now."

CRUISE AND YIELD STUDY FOR MANAGEMENT ¹

By R. R. FENSKA, *Professor of Forest Engineering, New York State College of Forestry*, and D. E. LAUDERBURN, *Forest Engineer, Pejepscot Paper Company*.

The development of growth studies and yield predictions for forest management has not kept pace in America with some of the other phases of the profession of forestry. One of the difficulties has been in the complex nature of some of our forests. In place of the even-aged stands of one or two species, so characteristic in European forests, we have usually an irregular and uneven-aged forest of several commercial species. Therefore European methods of growth studies and yield predictions for forest management have not as a rule been practical or applicable to our forests here.

During the summer of 1923 a method was used on the timber holdings of the Pejepscot Paper Company in Compton County, Quebec, Canada, which gave all the data for an inventory of the timber, rate of growth, and figures for yield prediction, and at the same time was simple, practical, and the results can be checked up on the ground at any time in the future.

THE FOREST

The 35,000 acres on which the following method was used contained uneven-aged softwood stands as well as mixed hardwoods and softwoods. In some places it approached a selection forest. The softwoods consisted chiefly of spruce and balsam fir, while the hardwoods were mainly hard maple, beech, and yellow birch. It was the same type and character of a forest that is found in many parts of the Adirondacks in New York State.

THE CRUISE

The tract was cruised and mapped according to forest types, cut-over (with date) and non-cut-over areas, compartments (logging units), and legal subdivisions. The division into types, and cut and non-cut

¹ Delivered before the annual meeting of the Society at Baltimore, December 27, 1923.

areas, was necessary in order to take into consideration the different rates of growth of spruce and balsam fir on these different areas; to make a more accurate prediction of future yields on each type and condition; and to furnish a detailed stock and stand table of the timber now on the property.

The field work was carried on by what is generally known as a "2½ per cent line-plot method," using a staff compass and chain for establishing the base lines, and a hand compass and pacing on the cruise lines.

East and west range lines,² two miles apart, were resurveyed and blazed and used as base lines. On these base lines stations twenty chains (1,320 feet) apart were established by blazing and scribing a tree on the line. From these stations the cruise lines were started north or south and "tied-in" to a base line and corresponding station at the end of every two miles. Whenever a cruise line intersected a road or stream a tree was scribed along the road or stream with the number of the cruise line.

At 5-chain intervals along these cruise lines quarter-acre plots were paced out and tree calipered and recorded; softwoods down to 1 inch d. b. h. and total heights and the hardwoods down to 9 inches d. b. h. and log lengths. Heights were made by ocular estimates but checked frequently with an Abney clinometer. All species were tallied separately and the spruce and balsam fir were further separated into "dead" and "green." The dead included all suppressed and other trees which would not survive until the next cut, ten years hence, but at present had a usable content.

The reason for thus separating the spruce and balsam fir was to allow for the mortality which will occur in the forest before the next cut is made. The present estimate therefore included both the "green" and "dead" spruce and balsam fir, but, in computing the yield for the next 10 years only the "green" trees were included.

A tree near the center of each plot was blazed on four sides and the face towards the center of the plot was scribed with the line and plot number, i. e. $\frac{16}{12}$, would indicate that it was plot No. 12 on cruise line 16. In the field notes the distance from the actual center of the

² In Quebec range lines run east and west instead of north and south as in the rectangular system of surveying in the United States.

plot to the scribed tree was recorded with its diameter and species. With this information it is possible at any future time to relocate the center of the original plot and tally and measure the trees on the plot for increased growth.

In connection with the field work, besides mapping in the types, cut-over areas, compartments, and property lines, all other data necessary for the proper management of the forest were secured, such as essential topographic features, and forest improvements. Contour lines were not sketched in because they were not deemed essential for the future management and planning of operations on this tract. The above information was all plotted on a map with a scale of 4 inches to the mile.

In addition to the above map an outline map of the property was drawn on which the relative location of the scribed plots were indicated by circles with the cruise line and plot number in the circle. This will facilitate the re-location of the plots in the future.

GROWTH AND YIELD

Since the property was held by a pulp and paper company which is primarily interested in the production of spruce and balsam fir, growth studies and yield predictions were confined to these two species.

On each quarter-acre plot in addition to tallying the trees a boring at d. b. h. was taken of the spruce or balsam fir nearest the center of the plot, the tree being one which in the opinion of the forester would survive until the next cut, ten years hence. The reason for boring the tree nearest the center of each plot was to eliminate the danger of selecting only the thriftiest trees and thus not getting an average rate of growth for that type. The last ten growth rings were measured unless there were indications of budworm attack, liberation of the crown, or other factors which affected the current rate of growth. In such cases only the rings which showed the present or current rate of growth were counted and measured. The species, diameter, and type within which the tree occurred was noted for each boring.

The next step was to determine the current annual diameter growth for spruce and for balsam fir by types and cut-over and non-cut-over areas. Instead of determining this growth for each diameter class separately, as has usually been advocated, it was found that there was little difference in the final result if the annual diameter growth for all the diameters of a species were totaled and an average rate of diameter

growth per year found for the different types and conditions. By using this method the office computations were greatly simplified and the cost of the work was reduced considerably over the usual method. It is not desired to give the impression that the method of determining future yields by computing the rate of growth for each diameter class is not a more refined or accurate method but it is felt the additional cost is not worth the additional accuracy which, moreover, may be counter-balanced by a score of unforeseen contingencies.

From the average current annual diameter growth was determined the number of years that would be required for the spruce or balsam fir to grow one inch in diameter for each type and condition. A stand table (showing number of trees of each diameter class) of the "green" spruce and balsam fir for each type and cut-over condition was then made.

Next, the average diameter growth for the particular species and condition was applied to the stand tables to determine how many of the trees in each diameter class would go into the next higher class, and how many would remain in their present diameter class 10 years hence. This increase from one diameter class to the next higher one was determined as follows:

If the average diameter growth for spruce on the upland softwood (not cut-over) type was found from the borings to be one inch in ten years, then all the trees in each of the diameter classes would move up one diameter class at the end of a decade. Or, if the rate of growth was one inch in diameter in five years then all the trees in each diameter class would move up two diameter classes during the next ten years. Or, again, if the rate of diameter growth was 1 inch in 12 years then ten-twelfths, or 83 per cent of the 6-inch trees would go into the 7-inch class and 17 per cent of the present 6-inch trees would still remain in that class at the end of 10 years. Also, 83 per cent of the present 7-inch class would go into the 8-inch class and 17 per cent remain as 7-inch trees. The same would apply to each diameter class.

By applying the proper rate of growth to the present stand tables for each of the types as indicated above, it was simply a matter of computation to determine the number of each diameter class for each species ten years hence. Applying a volume table to the computed stand 10 years hence we have the yield for that year and by subtracting the present volume we know the net growth for the next 10 years.

PERMANENT RECORD

Another feature of the above system is the simplicity of the permanent record established, with only three sets of record sheets as follows:

1. Tally sheets with record of trees tallied, topography, and computation of stand on each quarter acre.
2. Stock sheets, giving the stand in compartments and sub-compartments.
3. Yield sheets, showing the predicted yields at the time of the next cut.

The ready reference to all the original field data and office computations which the above permanent records afford will make them very valuable to any person doing work on the forest at any future time.

VOLUME TABLES

The advantages of a form class volume table based on taper tables have not been generally recognized in this country. Since these tables give the cubic contents of coniferous trees very accurately for any particular degree of utilization on a forest they should be used entirely in the management of our softwood stands for pulp and paper companies.

In connection with the above yield study of spruce and balsam fir it was necessary to have reliable volume tables. Existing tables were not deemed suitable for either of these species in that region for the close utilization practiced on this forest. Therefore, it was decided to construct local volume tables which would meet all requirements. Since good taper tables for spruce and balsam fir had already been made³ a form class volume table for each of these species, based on these taper tables, was constructed as follows:

Two men following pulpwood peeling operations on the forest measured about 50 trees each of spruce and balsam fir to determine the form class of each species for the trees on that tract. This did not take long since the only measurements needed were the diameter breast high, inside and outside the bark, and the diameter inside the bark half way between d. b. h. and the tip of the tree. With these data a form class volume table for that particular locality and degree of utilization

³ Investigation of Taper as a Factor in Measurement of Standing Timber. By W. G. Wright, Dominion Forest Service, Ottawa, Canada.

was constructed from the general taper tables for spruce and for balsam fir.

In constructing the above tables the volume for each diameter and height class was first computed in cubic feet of peeled wood by 4-foot sections and converted into stacked cords by using a converting factor of 94.27. This converting factor of 94.27 was determined by actually measuring and computing the number of solid cubic feet in 20 stacked cords (4 feet by 4 feet by 8 feet) of peeled pulpwood.

COST

The cost of this cruise and yield study for the 35,000 acres was 12 cents per acre of which 9 cents was for field work and the 3 cents for office work.

SUMMARY

The advantages of such a cruise and yield study as outlined above may be summarized as follows:

1. An accurate and detailed estimate and stand table of the timber.
 2. A reliable and detailed map giving all information necessary for planning future operations on the forest.
 3. A large number of accurately located points at regular intervals throughout the forest which can be used in the future to delimit the boundaries of future cuts, windfalls, etc., doing away with the necessity for a complete survey every time such information is desired.
 4. Thousands of sample plots which may be tallied over and over again. Any experimental work such as girdling hardwoods, thinnings, etc., may be carried out over areas in which the sample plots are located, and retallied at intervals of several years which will show the results.
 5. It is a practical and simple method for bringing our uneven-aged and mixed forests under management.
 6. The method has been made as simple as possible, with the minimum of computations, and all part of a permanent record concentrated on the least possible number of tally and computation sheets.
 7. Through the system developed and the simplicity of it, it is possible to carry out this work at a moderate cost.
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THE TEACHING OF FORESTRY IN AGRICULTURAL COLLEGES ¹

BY KARL W. WOODWARD

Professor of Forestry, University of New Hampshire

In brief the purpose of the courses in forestry in agricultural colleges is to educate the leaders of agricultural thought to a due appreciation of the possibilities of the farm woodlot as an annual crop producing part of the farm. It has only been a mine in the past. Even the more progressive farmers have seldom thought of their forest products as anything more than periodic crops; crops which were cut at such long intervals that skill in their marketing and production were not practicable.

And yet the average farm has not only the area which should be devoted to growing forest crops but the tillage areas languish for the lack of a well balanced program such as the woodland can alone give. Timber is preeminently a winter crop and gives employment to men and teams so that a permanent force may be maintained. Farming must cease to be a seasonal business if it is to prosper. It must flatten out the peaks of the rush seasons and fill in the hollows of slack employment.

To make a farm woodlot yield annual crops the same principles will, of course, apply that hold good for a million acre forest. There must be skill in marketing, harvesting and regeneration. But with farm woodlands there are certain limiting factors which make the application of the principles of forestry decidedly different from the way in which they work out on large areas. There is not the same volume of business and the woodlot must fit into the plan for the farm as a whole. Still more important from the instructor's viewpoint is the time consideration. He must compress his course into the narrow limits prescribed by academic tradition and the absorptive capacity of the student.

Obviously then he cannot get out the notebook he filled in forest school and dispense silviculture a la Toumey or management a la Roth

¹ Delivered before the annual meeting of the Society at Baltimore, December 27, 1923.

in raw doses. His teaching must first of all be localized. Agricultural students in Maine do not take a vivid interest in the grandeur of *Sequoia sempervicens*. Then, too, there must be condensation. For example, the essential points of budget control by volume must be presented, but only the essential features. Still more difficult is the constant bearing in mind that the woodlot is simply one of several farm enterprises. It must not be pursued as an end in itself. No work in it should be laid out during the rush seasons for other crops. What makes the problem still more complex is that the findings of farm management have not yet received general acceptance among tillage land experts. Each pursues his subject without reference to the whole. The only remedy for this is, of course, greater insistence upon seeing the farm as a whole. This will in turn lead to forestry receiving greater relative weight. Too often in the past it has been the last unwelcome interloper in a schedule already crowded full.

These special demands require special treatment. Good pedagogy seems to dictate that the instructor should try to place himself mentally in the attitude of the woodlot owner. What questions arise in his mind when he heads toward his woodlot? Unfortunately for the accepted academic procedure he does not rise on a winter morning fully resolved to devote the day to silvicultural problems and leave for the morrow questions in utilization and management. Does he not think somewhat in this way? "We must get out 20 cords of wood this winter. The handiest place to cut it is in the back pasture in that young stand of hardwood." There's where most farmers stop. It is the role of forestry to lead them to continue after some such fashion as this: "But that young stand is growing fast and if I go and dig a hole in it, I'm spoiling my chances for some good hardwood lumber. Can't I get what I want by only cutting the poor trees out of that corner of the pasture and get the rest from defective trees in the other parts of the woodlot? But will that make my wood cost too much? Will my help do it? Won't they get uneasy and quit? Can I sell five cords of that sort of wood as I planned?"

In other words, it should be the aim of a course in farm forestry to answer directly the questions which come up in a definite region and not hold to the divisions of the subject which have been adopted for formal academic treatment. The silviculture, utilization and management taught must be applied to specific problems even though this involves repetition.

Summarizing, then, the teaching of farm forestry demands the application to localized specific problems of the principles of silviculture, utilization and management. A knowledge of farm management is an important prerequisite. Handled in this way it will not only aid materially in solving our national timber supply problem but also be a factor of the first importance in our food production. But the object is not the training of experts in forestry any more than exposure to a course in hygiene qualifies a man to handle a typhoid fever case. A graduate of an agricultural college does not treat his serious cases of horse and cow disease. He calls in a veterinarian. All that a course in farm forestry should attempt to give is a working knowledge of the simpler parts of woodlot handling, and an appreciation of the forester's problems.

REVIEWS

Pulpwood and Wood Pulp in North America. By Royal S. Kellogg. McGraw-Hill Book Co., New York City.

Kellogg has given a clear description of the mechanical process of manufacturing paper as well as the sulphite, soda, and sulphite processes. He has drawn an accurate picture of the consumption of pulpwood in the United States and Canada, the methods of logging, and the units of measurement. He makes a strong plea for weighing the raw product instead of scaling it as under present practice. Any one desiring statistics on any phase of the North American pulpwood problem, with the exception of Alaska, which appears to be omitted, should be able to find it in this volume. The book is divided into five parts. Part I, Woodpulp; Part II, Pulp Woods; Part III, Timber Supply; Part IV, Timber Production, and Part V, A Permanent Industry.

Kellogg emphasizes the need for forestry, if the pulpwood industry is to continue at its present rate of production, but when it comes to analyzing the business of forest management rather a gloomy picture is painted. Recognizing that "forestry aims at continuous production and the reproduction, growth, and *exploitation* of ripe timber," Kellogg criticises the present New York State policy of using its forests only for recreation and watershed protection. It is indeed unfortunate, he argues, that the State is bound to such a conservative policy of forest management.

Yet, judging from the recent referendum, the people of New York approve of the present conservative methods. Quite frequently the forester engaged on propaganda takes too rosy an outlook of the financial side of forest production. Kellogg, it may appear, goes to the other extreme when it comes to reciting the hazards of forest fires, storms, fungi, and insects; but when one considers the past history of unsuccessful fire protection and the fungus and insect damages to chestnut, white pine, larch, western yellow pine, and balsam, probably Kellogg's picture is more accurate than that painted by the propagandist. Add to this the cost of forestry where the owner starts with bare land, and the picture of forest "profits" indeed becomes a somber one.

If Kellogg had given a picture of forestry *as a going concern* he might have taken as an illustration a *producing forest* which had all age classes of timber represented. In such case, the owner need not wait until his children's children are old men to harvest his merchantable timber, and here is the crux of the question: Shall private owners be allowed to devastate their merchantable timber and force future generations to start forestry with the bare land, or shall the State insist on "restrictive measures" to prevent the owner from harvesting all of his mature timber? I fear that Kellogg would answer in the negative, and I am certain that Pinchot would stand for restrictions in the interest of a broader national forestry policy for the best interests of the country.

T. S. W., JR.

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NOTES

ASSOCIATION OF FOREST ENGINEERS

The Association of Forest Engineers of the Province of Quebec at their annual meeting in 1922 decided to attempt to take their proper place as leaders of public opinion in the matter of forest policy. They felt that unless the technical foresters handled the subject of national forest policy it would inevitably fall into the hands of those who were interested in exploitation of the forests for profit only, or that the general public might be lead by propaganda of more or less sentimental character to effect measures which would make it very difficult for wood-using industries to operate, and be in the long run detrimental to the good of the country.

At their annual meeting held in Quebec December 18 and 19, 1923, this question came up for further discussion and it was decided that the most important matter was that of fire prevention, and in order to do everything possible they drew up a scheme for the proper protection of the forests which was sent to the Prime Minister of the Province and will later be published. They also drew up a general forest policy for the Province of Quebec with the object of perpetuating the wood-using industries in the Province, safeguarding the watersheds of rivers used for the development of water power, and the general good of the colonists and other interests of the public. The chief points in their recommendation were: An immediate inventory of the forests of the Province which should give the area in forest the average annual growth, and also recommended the preparation of management plans fixing the possibility of each region or main watershed. They also recommended measures which could determine the proper methods of logging to ensure sustained yield and prompt regeneration, and at the same time which would be economically applicable for those industries operating with wood as a raw material. They recommended the creation of forest reserves for those industries already existing in the Province which are likely without this safeguard to find themselves short of wood in the near future. They also advised the establishment as permanent forest reserves of all blocks of land which shall be determined to be unsuitable for agriculture. To this end it was recommended that an independent bureau of soils

be established to make such classification so that neither the Department of Lands and Forests nor the Department of Colonization could be said to have any interest in such classification. They recommended the protection of all the forests of the Province by the most appropriate methods, such as proper disposition of logging debris and the study of insect and fungus damage. They recommended that the Government should undertake the reforestation of land unfit for cultivation, drifting sands, and other waste sections, the creation and protection of forests on the heads of rivers used for the development of water power, and finally an active forestry propaganda.

The meeting expressed itself unanimously in favor of an embargo on the export of unmanufactured pulp wood both on public and privately owned lands, provided some means might be found by which the wood using industries would undertake to absorb wood cut by colonists. A letter was addressed to Premier King protesting strenuously against the Order in Council postponing the imposition of an embargo for ten years.

A resolution was also adopted requesting the Department of Lands and Forests to issue a yearly report giving the results of its nursery and silvicultural work, explorations, growth studies, and so forth, for the benefit of the forestry profession and the public at large.

A resolution of sympathy was also sent to the family of Mr. Landry who lost his life in the discharge of his duty as observer in the aerial exploration work of the Quebec Government.

BOYS DOING MUCH GOOD IN FOREST CONSERVATION

While little is being said about it, the Conservation Department of Louisiana is doing some work that will be of great value in the future. Not the least of the various projects is the work being done by the boys from 9 to 18 years of age who belong to the reforestation clubs. There are in the State about 600 of these boys who are working under the control of various conservation agents. Under this plan each boy who joins the club agrees to take one acre or more of cut-over land, to establish a fire line around it by removing the combustible material so that fire may not easily enter it, thin out the seedling pines if they are too thick or transplant if too thin, cut off and remove all undesirable timber and all large logs, and in general to promote the growth of a good crop of pine timber in any way possible.

WHITE PINE BLISTER RUST IN SWITZERLAND

The remarkably rapid spread of white pine blister rust in Switzerland since 1904 leads Professor Doctor Schellenberg of Zurich to discuss at considerable length the life history of the disease and the possibility of its control.

It is interesting to know that he reaches the same conclusion that we have here, that white pine can only be grown at a distance from the Genus *Ribes*.

In descending order the vigor of infection is as follows:

	<i>Per cent</i>
<i>Ribes nigrum</i>	100
petraeum	90—100
alpinum	70—90
uva crisa	60—80
Gross ularia	20—80
sanguineum	60—80
Gordonianum	60—80
aureum	50—70
rubrum	20—40

K. W. W.

Die Empfänglichkeit der *Ribes* arten für den Rost der Weymouthkiefer. Schweizerische Zeitschrift für Forstwesen, Jan.-Feb., 1923, pp. 25-30.

Mrs. Alfred H. Anderson, widow of a pioneer lumberman of Seattle, has presented to the Board of Regents of the University of Washington \$250,000 to be expended for a building to be called "The Alfred H. Anderson Hall of the College of Forestry," in memory of her husband. The building will be constructed at once near the present Forest Products Laboratory.—*Science*, December 14, 1923.

V. H. Sonderegger, State Forester for the Louisiana Department of Conservation, was elected president of the Association of State Foresters, at its fourth annual meeting at Harrisburg, Pa., November 13 to 15.

SOCIETY AFFAIRS

RESULT OF THE ELECTION

Officers for 1924

In the ballot for officers and member of the Executive Council for the year 1924, there were 326 votes cast. Four of these were invalid because the voting members were in arrears for their 1923 dues, and six others were eliminated because they were anonymous. There remained 316 valid ballots, or 70 per cent of those entitled to vote—exactly the same percentage as voted in last year's election. The result was as follows:

For President:

Walter Mulford	180
W. T. Cox	134
R. S. Hosmer	1
Not voting	1

For Vice-President:

R. T. Fisher	173
D. T. Mason	141
Not voting	2

For Secretary:

R. V. Reynolds	158
E. N. Munns	144
W. N. Sparhawk	1
Not voting	13

For Treasurer:

F. W. Besley	301
Not voting	15

For Member Executive Council for five years, 1924-1928:

E. H. Frothingham	188
A. F. Hawes	119
B. P. Kirkland	1
Not voting	8

Ballot for Fellow

In the ballot for Fellow, 299 votes were cast, of which 10 were invalid because of unpaid dues or because the ballots were anonymous. This left 289 valid votes, requiring 217 (three-fourths) to elect. H. H. Chapman, the only candidate, received 220 affirmative votes and is therefore elected to the grade of Fellow.

C. R. TILLOTSON,
L. S. MURPHY, *Tellers.*

THE ANNUAL MEETING

In point of attendance of Seniors Members and Fellows, the annual meeting of the Society at Baltimore, December 27-28, was even larger than the Boston meeting last year, there being 60 voting members present compared with 52 at Boston. Nor was this due, as may be supposed, to Baltimore's proximity to Washington, for only 28 of the 81 members of the Society in attendance came from the District of Columbia or its suburbs. One factor which contributed toward making the meeting perhaps the most successful ever held was the diversity of interests represented. It is evident that we have definitely gotten past the time when Society of American Foresters and United States Forest Service were more or less synonymous, for analysis shows that of the 81 members of the Society at the meeting, only 16 were from the Forest Service, while 18 represented State forest departments, 16 were foresters in private employ or consulting foresters, 11 represented forest schools, 11 are employed by Federal departments other than the Forest Service, and 9 represented miscellaneous interests. As a result, there was a lively discussion of practically every paper and report presented.

In interest, the papers averaged considerably higher than those presented at previous meetings, and must have been a revelation to any who may have been still under the impression that all of the forestry work in the United States is being done by the Forest Service. A special feature was the reports of several of the standing committees, particularly those on the History of Forestry, Forest Education, Interest Rates, and Standardization of Forest Fire Practice. The Resolutions Committee, catching the spirit of the meeting, sat on the lid with most praiseworthy results.

Especially stimulating were the addresses of the retiring President, in which he urged that the Society assert itself more actively as the spokesman of the profession, and of the retiring Vice-President, who made a plea for the maintenance of high professional ideals and firm adherence to the principle of free discussion on all matters of methods and policies.

Perhaps the most important matter that came before the meeting was the discussion on the advisability of employing a paid Executive Secretary, and the formulation of recommendations to the incoming Executive Council for action looking toward such a result. This project, which will involve radical changes in the present organization of the

Society, will be carefully considered by the Council and thoroughly discussed by the Sections and individual members before being laid before the Society for action. If the plan can be carried out, it will be the most far-reaching step that has been yet undertaken to put the profession of forestry in the United States on its own feet as a sure-enough grown-up profession, with definite ideas and ideals of its own.

The detailed minutes of the meeting are printed below.

MINUTES OF THE ANNUAL MEETING OF THE SOCIETY AT BALTIMORE, MARYLAND,
DECEMBER 27-28, 1923

The meeting was called to order by President R. S. Hosmer at 9.30 a. m., in the Mechanical Engineering Building of Johns Hopkins University.

The following papers were read and discussed:

"A progress report on reseeding cut-over lands to loblolly pine," by J. A. Cope.

"Coal land forestry and its practical limitations," by A. C. Silvius.

"Cruising for quick values in the Northeast," by James W. Sewall, read by H. H. Tryon.

"Reforestation progress and costs in southwestern Pennsylvania," by Walter D. Ludwig, read by J. S. Illick.

"Management studies on cottonwood and silver maple," by Karl A. Swenning.

The report of the Committee on Rate of Interest in Forestry was then read by H. H. Chapman, a member of the committee. After some discussion, it was voted to accept the report, with the recommendation that it be printed in the JOURNAL OF FORESTRY, and to thank the committee for its work.

The report of the Committee on the History of Forestry in the United States was then read by J. P. Kinney, a member of the committee, and accepted with the recommendation that it be published in an early issue of the JOURNAL OF FORESTRY, together with an appeal to the membership of the Society for suggestions along the lines covered in the report. It was also voted to recommend that the committee be continued.

The Secretary then read a brief report from R. T. Fisher, Chairman of the Committee on Research, which was as follows:

" . . . with the present actual and prospective agencies for the prosecution and organization of research, there is no reason for active

participation by the Society, especially since it is already represented in existing organizations. It would seem well for the Society to continue a Research Committee in office to keep in touch with the general investigative programs, to suggest from time to time projects which might be overlooked and to keep its members informed, perhaps through a department in the JOURNAL, of the general progress of forest research in the country."

This report was accepted with the recommendation that the committee be continued.

The meeting then recessed for luncheon, after which it was again called to order by President Hosmer at 2.00 p. m.

The following papers were read and discussed:

"A cruise and yield study for management," by R. R. Fenska and D. E. Lauderburn, read by R. R. Fenska.

"Efficient forest utilization, a major factor in an effective national forest policy," by Carlile P. Winslow.

"The work of the foresters of the Pennsylvania Railroad System," by John Foley.

At this point President Hosmer appointed as Committee on Resolutions, R. Y. Stuart (chairman), Ellwood Wilson, and J. G. Peters.

The following papers were then read:

"How one wood using industry has made use of a forester," by Guy C. Hawkins.

"The teaching of forestry in agricultural colleges," by Karl W. Woodward.

Col. H. S. Graves then presented the report of the Committee on Forest Education, which provoked very lively discussion from men representing the Forest Service, the schools, and private forestry. The discussion finally had to be stopped to give the members time to reach the hotel for dinner.

Sixty-nine members and guests assembled for dinner at the Southern Hotel at 6.30 p. m. After the dinner Col. W. B. Greeley spoke on the work of the Senate Select Committee on Reforestation, and O. M. Butler discussed the situation in which the American Forestry Association finds itself, concluding with an appeal to technical foresters to get behind the magazine, especially by contributing material.

Following announcement by the Secretary of the result of the ballots for officers and for Fellow, President Hosmer reviewed the work of the Society during the past year and made recommendations for the

future. He urged especially increasing the membership so as to take in the great majority of the eligible foresters, in order that the Society may be truly representative of the profession, and also urged that the Society should assume the leadership in matters of technical forestry in the country and should become more truly the spokesman of the profession. He concluded by recommending that the Society adopt and publish as its official platform a statement of its position with regard to a national forest policy, i. e., of the objectives which it endorses. A tentative draft of such a statement was suggested.

H. H. Chapman, the retiring Vice-President, followed with an address on the "Relations of the Society of American Foresters to the profession of forestry," in which he pointed out that the leadership in forestry always has been and must be in the hands of trained professional foresters, and that the profession as such must have the constructive leadership of an active organization such as the Society, if it is to live. Bureaucracies, whether in government or private business, by censoring the ideas of individuals and suppressing self expression, kill efficiency while striving for it. The Society must always recognize the right to differ in opinion on methods and policies, and must afford opportunity for free discussion as the only way to attain the truth. At the same time, it should uphold the spirit of the profession by formulating a standard of professional ethics, of which the underlying principle should be to work constructively, for the common good, irrespective of differences of opinion as to methods. F. A. Silcox discussed the same subjects at some length.

The matter of securing a paid Executive Secretary was then brought up and thoroughly discussed. It was fairly generally agreed that such a move is desirable, but that an underpaid man or one on a part-time basis would be worse than none at all and a waste of money. F. W. Besley presented a statement regarding the condition of the Society's treasury and the probable amounts available under the present organization. Considerable discussion ensued as to ways and means of financing an Executive Secretary, the various suggestions including economizing on the JOURNAL, increasing the membership, raising the membership dues, charging an initiation fee, increasing the subscriptions and advertising in the JOURNAL, and the establishing of a service and employment bureau which would operate on a fee basis. It was emphasized by several speakers that the duties of such a secretary should be more specifically defined. Upon motion of K. W.

Woodward it was voted that the chairman appoint a committee, including Butler, to consider the matter of securing a paid secretary, including an outline of his duties and means by which his office might be financed. This committee was instructed to report on Friday morning. President Hosmer appointed Silcox (chairman), Butler, Sparhawk, Foley, and Woodward.

The meeting recessed at 11.30 p. m., to meet again at 9.45 a. m., Friday, December 28, at which time it was again called to order by President Hosmer.

The report of the Committee on Standardization of Forest Fire Practice was presented by R. Y. Stuart, chairman, and on motion of J. G. Peters was accepted and the committee continued, with a recommendation to the Editor that it be printed in an early number of the JOURNAL OF FORESTRY, together with a special request for comments from the members of the Society or others, to be sent to the chairman of the committee.

C. P. Winslow then read a paper by Miss Eloise Gerry on "The effect of light chipping upon resin yield and microscopic structure," after which the meeting voted to accept the report of the Committee on Forest Education (presented Thursday afternoon), and recommended that the committee be continued.

The business meeting of the Society then followed. Reading of the minutes of the last annual meeting was waived, after which reports of Secretary Sparhawk and Treasurer Besley were read and accepted, with the understanding that the Treasurer's report would be brought down to the end of the calendar year before being audited and printed. No reports were presented by the Editorial Board or the member in charge of Admissions.

F. A. Silcox then presented the report of the special committee appointed to consider the plans for a paid Secretary. Following a lively discussion in which it was emphasized that this meeting may only discuss the matter and make recommendations to the Executive Council for the further formulation of plans to be recommended to the Society as a whole, the report was accepted and referred to the Executive Council with a request for early action. An amendment proposed by Barrington Moore that the present committee be continued, with the addition of members from other Sections of the Society, to handle the details of working out the final plan and getting it adopted, was defeated after some discussion. On an informal vote

for the information of the council, the meeting voted unanimously (55 Members and Senior Members voting) in favor of raising the dues as suggested by the special committee. It appeared to be the general consensus of the meeting that more money should be allowed for the JOURNAL, rather than less.

The question was raised by Barrington Moore, Silcox, and others as to the advisability of having the individual Sections send duly accredited delegates to the meetings of the Society, authorized to represent the Sections, so that the meetings might take definite action on policy matters which would be binding on the Society. In the ensuing discussion the idea was opposed on the grounds that it would increase the complexity of the organization, that there is usually so much individual difference of opinion within Sections that no delegate could speak for the entire Section, and because the Society is primarily a technical society rather than a trade organization. No action was taken on the proposal. In the course of the discussion it was brought out that seven of the fourteen Sections were represented at the meeting, and that seven Sections are represented in the nine members of the 1924 Executive Council.

Upon motion of J. G. Peters it was voted that the incoming President be requested to appoint a committee on "The place of efficiency in utilization in a national policy of forestry." Upon motion of F. A. Silcox the meeting voted that the statement of policy proposed by President Hosmer in his address on Thursday evening be submitted to the Executive Council with the recommendation that it be taken up at once with the local Sections for suggestion and comment, that some such statement be formulated at an early date by the council, and that the council give it wide publicity as the platform endorsed by the Society.

The meeting recessed for luncheon at 12.40 to meet again at 2.15 p. m.

A paper on "The gypsy moth situation as it applies to New York State," by H. L. McIntire, was read by Dr. E. P. Felt, State Entomologist of New York.

In the absence of a report from the Committee on Professional Ethics (President Hosmer read a letter from F. E. Olmsted, chairman of the committee, promising a report later), H. H. Chapman read a paper on professional ethics prepared by Col. T. S. Woolsey, Jr., a member of the committee. This paper was discussed at some length,

after which it was voted to request the incoming President to continue the present committee.

At this point R. Y. Stuart presented the report of the Committee on Resolutions. He stated that a proposed resolution advocating appropriations for the control of gypsy moth was not favored by the committee because it singled out one small part of a large problem which had not been considered as a whole by the Society or the committee, and would tend to give the misleading idea that the Society had picked out this particular phase as deserving of special emphasis, when perhaps others are equally if not more important. Another proposed resolution, endorsing the McNary Forestry Bill, was not favored by the committee because only a small minority of the Society was present at the meeting and because few of the members have as yet had an opportunity to become familiar with the terms of the bill.

The meeting then voted that a copy of the McNary Bill or a summary of its provisions should be sent to each member of the Society for a referendum *Yes* or *No* vote on a statement something like "We do (or do not) consider that the enactment of this bill will mark an advanced step toward the formulation of an adequate forest policy for the nation." In addition, members should be asked to suggest any changes that may seem desirable in the bill. The result of this vote and a summary of the suggested modifications are to be transmitted to Senator McNary at an early date (before the bill comes up for action in Congress).

The following resolution reported by the committee was adopted without dissent:

"Whereas, the States of Kentucky, Mississippi, and South Carolina are among those which have no State forestry departments, and

Whereas, the legislatures of these States meet in January, 1924, be it

Resolved by the Society of American Foresters assembled at its annual meeting in Baltimore, Maryland, that the Governors of those States be urged to present to the legislatures the need for the establishment of such departments as a means of adopting a policy of forestry adequate to meet their future timber needs, and be it further

Resolved that a copy of this resolution be sent to the Governor of each of those States."

Upon motion of the Resolutions Committee a rising vote of thanks was then given to State Forester Besley and the other members of his

department for their hospitality and painstaking efforts to make this meeting a success.

Munns then proposed a resolution endorsing in general terms legislation looking toward the study and control of forest insects, diseases, and fires. This was voted down on the ground that it did not present any new policy for the Society, and was too general to enable any specific use to be made of it. Hosmer suggested that a recommendation be made to the Executive Council to incorporate some such clause in the statement of policy which is to be formulated. Ziegler offered a resolution asking Congress to assist New York in the control of the gypsy moth, which was not adopted. Peters then offered a resolution similar to that proposed by Munns. It was voted down unanimously.

A paper on "The present status of the chestnut blight" was then read by G. F. Gravatt, Pathologist of the U. S. Department of Agriculture, after which the report of the Committee on Sections (A. J. Jaenicke, chairman) was then read by the Secretary. It was accepted, with the recommendation that the new President continue the committee.

F. W. Besley then made a brief statement regarding the work of the committee of scientific societies which is working for the establishment of a National Arboretum at Washington.

At this point the following papers were read by title by the Secretary:

"Forest policy of the Champion Fibre Company," by W. J. Damtoft.

"Comparison of the volumes of virgin white pine stands in Pennsylvania," by R. R. Chaffee.

"The sap stain problem and a ten million dollar loss," by E. E. Hubert.

"Recent developments in lumber distribution," by Nelson C. Brown.

"The importance of duff moisture content in the forest fire problem," by H. T. Gisborne.

"Forest fires and storm movement," by E. F. McCarthy.

• "The forest entomological problems in the Lake States," by S. A. Graham.

Following these the Secretary read a paper by E. G. Cheyney on "Farm forestry extension." This paper called forth a lively and lengthy discussion, in which the points were made that individual plans will have to be adopted for given States, because with the great variety of conditions generalization is impossible. The integrity of the State forestry departments must not be jeopardized by the extension program, the State forester should always be consulted in making decisions

to policies and subject matter of extension, extension work should be confined to educational activities, and the extension forester should always be a technically trained forester.

The meeting adjourned at 6.40 p. m.

Total registered attendance included 3 Fellows, 57 Senior Members, 11 Members, and 8 guests. Several others failed to register.

W. N. SPARHAWK, *Secretary*.

REPORT OF THE SECRETARY

The membership of the Society has shown a healthy growth during the past year, and now consists of 7 Fellows, 446 Senior Members, 24 Members, 76 Associate Members, 9 Honorary Members, and 2 Corresponding Members, a total of 965, which is a net increase of 80 over the number on January 1. The total increase includes 36 Senior Members and 144 Members. In addition, 4 Senior Members (3 promoted from Members), 15 Members and one Associate Member, elected on October 18 and December 8, have not yet formally accepted their election. These will bring the total to 982. These figures are brought down to December 31, 1923.

During the year 7 members have been lost by death: Bernhard Eduard Fernow (Fellow), William Darrow Clark and Joseph J. Dearborn (Senior Members), Harold Harper Lansing and Walter Stewart Rohde (Members), and John W. Fox and John E. Rhodes (Associate Members). Three Senior Members and 2 Members resigned in good standing, and 5 Senior Members and 13 Members were dropped for non-payment of dues for 1922. Eight Associate Members were elected to Membership, 39 Members to Senior Membership, and one Senior Member was made a Fellow. One man declined election to Membership, while the names of 8 men elected to Membership and one to Associate Membership were dropped from the rolls because they failed to accept their election.

The Ohio Valley Section completed its organization during the year, while the Pennsylvania Section, enlarging its territory to include New Jersey, Delaware, Maryland, and part of West Virginia, changed its name to Allegheny Section. The whole United States is now fairly well covered by the Section organizations, excepting the South. It is hoped that a Section can be organized there in the near future.

The two amendments to the Constitution proposed by the California Section, which would have deprived the Society as a whole of a voice

to letter ballot early in the year. Neither obtained the three-fourths vote necessary for adoption.

The professional standing of the Society undoubtedly requires that it should remain a unit rather than a more or less loose federation of local sectional societies. Nevertheless it seems fairly obvious that with our large and widely dispersed membership, a large part of the Society's objectives, namely, the creation of "opportunity for an interchange of views upon forestry and allied subjects" and the fostering of a "spirit of comradeship among foresters," must be accomplished through the local Sections. No means should be left untried by which the several Sections and individual members may be encouraged and stimulated to cooperate actively in carrying on the work of the Society. One form of stimulus which is worthy of very serious consideration is to give each Section and individual member a greater sense of responsibility for the work of the Society as a whole.

With nearly 500 members entitled to vote, certain parts of our Constitution, for instance the provision that 7 Senior Members or Fellows shall constitute a quorum for the transaction of Society business, seem to need revision. Moreover, now that it is a practical impossibility for more than a comparatively small minority of the voting members to attend a meeting of the Society, no matter where it may be held, it is manifestly unfair and undemocratic that this small minority should have the power to commit the Society as a whole to policies or the support of principles concerning which there are known to be wide differences of opinion. I do not think that such action has been taken in the past, but there is always the danger, and there is also the psychological effect upon the large majority of members of the feeling that they have little or no voice in carrying on the business of the Society.

I should like to suggest that a committee be chosen or appointed, or the Executive Council instructed, to develop plans for giving the local Sections and individual members more direct responsibility and interest in the affairs of the Society as a whole, including the publication of the JOURNAL. This committee should suggest such revision of the present Constitution as may seem desirable in order to accomplish the purpose, or for other reasons. It should, if possible, report within the next few months, in order that any proposed amendments may be acted upon by the Society in time to become effective, if adopted, before the end of this coming calendar year.

W. N. SPARHAWK, *Secretary.*

MEMBERSHIP

A. E. Oman has resigned from Senior Membership.

REPORT OF THE COMMITTEE ON SECTIONS

This committee was appointed by Professor Hosmer for the calendar year 1923. Its personnel is made up of the secretaries of seven of the Sections of the Society. The committee has hardly got under way but it is already evident that its sphere of usefulness is such as to amply justify the continuance of a similar committee for several years.

It is believed that the committee can be of service to the Society to the profession, and to the forestry movement generally:

1. By bringing about closer cooperation between the various Sections.
2. By fostering the systematic study of local forest problems by committees of Section members.
3. By increasing the interest of the Sections and its members in both forestry matters and the welfare of the Society.
4. By stimulating the efforts of the Sections to secure the membership of all qualified foresters in the Society.

A number of the Sections of the Society are not functioning in as virile and as active a manner as they should. In some Sections professional pride in the Society, even among its older members, is at a low ebb. Many members do not even read the JOURNAL and more still have never contributed to its columns. In most cases, the same five or six members of each Section carry the brunt of the work, and satisfactory attendance at meetings is difficult to secure. Often there is no definite plan for holding meetings and no thought is given to the preparation of a program beyond the next meeting. There is very little real leadership taken in forestry matters by some of the Sections. Too frequently, fully qualified foresters have either no inclination to become members of the Society, or they are entirely overlooked as potential and desirable additions to the Society. But few Sections have made any serious attempt to secure a better understanding by the public of the necessity for a national forestry program. In short, there is abundant evidence that the Sections of the Society can function much more adequately than they now are.

The ways and means by which a committee on Sections can best secure a betterment of the enumerated conditions are not yet clear.

is evident, however, that only through closer interchange of thought and action between the Sections can material betterment of existing conditions be secured.

It is true that each Section has its own peculiar problems of existence and growth to work out, but there are such matters as membership, meetings, efforts to secure greater recognition for the needs of forestry research, and for wider application of forestry principles already known, which all Sections have in common and which they can cooperatively work out together to splendid advantage.

The committee needs another year to get on its feet. There is a real work for it to perform, a work which is urgently needed, especially at this juncture in the national forestry movement.

A. J. JAENICKE, *Chairman.*

REPORT OF COMMITTEE ON STANDARDIZATION OF FOREST FIRE PROTECTION MEASURES AND EQUIPMENT

Members of the Society should comment fully on the recommendations of the committee. It is a vital field of activity for a large number of foresters.

This report is presented as the result of the work of the committee by itself and in cooperation with the Committee on Standardization of Fire Reports, appointed by the Association of State Foresters.

The committees, working in cooperation, during the fall of 1922 prepared an outline for a standard fire report, and this outline, which has been slightly altered in accordance with ideas expressed at the meeting of the Association of State Foresters, is presented herewith:

SUGGESTED OUTLINE OF STANDARD FIRE REPORT

Report of each fire should contain the following information:

1. Location.—(Local interest). Starting with largest political, topographic or land survey unit and carried down to a unit sufficiently small to enable a definite relocation on a map or on the ground. Suggest various forms based on (a) political, (b) land survey, and (c) topographic units.) Where existing units are not definite enough, distance and direction from a known point, such as post office, railroad station, topographic features, etc., should be given.

2. Time.—(Of local interest). Should include information as accurate as possible, giving month and day, hour of origin, a. m. or p. m. Time discovered, how and by whom, time reported to organi-

zation employee, time work began on fire, time fire was under control and work was finished.

3. Area.—(Standard). Best unit of area is acre. Need of careful and accurate estimate of area, and in some cases actual measurements desirable, because area is usually the basis of figuring fire damage. Require sketch, to scale, of area burned over.

Area burned should be classified so as to show extent of public and privately owned land burned over, area of general types (hardwood or softwood) should also show area of forest land under these headings.

1. That contain merchantable growth.
2. That contain unmerchantable growth.
3. That contain no tree growth.

There should also be shown the area of non-forest land.

4. Damage.—(Standard). First item under damage should be some statement as to when the area was previously burned over. This item, however, is more a matter of local interest and of value in helping the checking officer to determine the accuracy of the estimated damage reported. Damage should be given under the following headings:

1. Merchantable growth.
2. Unmerchantable growth.
3. Wood products.
4. Other forest products.
5. Improvements.
6. Other losses.

Standard requirements demand that these statements of damage include amount of cubic feet, board feet or cords as well as estimated damage in dollars.

5. The Cause of Fire.—(Standard). The standard classification has already been adopted by the U. S. Forest Service, and is practically accepted in all of the States. However, for the local official it is much better to have the individual reporting the cause of the fire to give as exact information as he knows concerning how the fire started. If he has no exact information, from the facts which he has learned, he should be able to express an opinion as to how the fire started. Local policy may demand that where the cause of the fire is known an affidavit setting forth the facts may be required to accompany the original report. With the exact cause of the fire given, or satisfactory opinion concerning its origin set forth, the officer who tabulates the

statistics can very easily place the fire in its proper classification as to cause.

6. Cost.—(Standard). For comparative figures it is probably unnecessary to give anything more than the total cost of extinction. However, by reason of various laws and organizations, it is probably most satisfactory to report the costs of extinction as follows:

1. Labor.
 - (a) Permanent.
 - (b) Temporary.
2. Supplies and provisions.
3. Transportation.
4. Other expenses.

These four items should be set forth so as to indicate the amount paid respectively by Association, State, Federal, and individuals.

7. Manner in which fire was discovered and action on it started.—(Local). It is important that this information be required for each report in order to check up the system of *detecting* fires and *reporting* them to those in charge of fire fighting to find out whether observation stations or patrols are functioning properly. Data showing time notice of fire was received and time work was begun enable a check of efficiency in *attacking* fires.

8. Miscellaneous items. (Local).

9. Signature. (Local).

The committee was also instructed to try to determine standards for estimating fire damage. Discussion between the members of the committee by mail and in personal meetings developed the difficulty of agreeing upon standards for estimating fire damage. A meeting was held in Washington on May 17, 1923, at which were present several members of the U. S. Forest Service and Messrs. Stuart and Toward representing the committee.

It is unnecessary at this time to refer to the detailed comments made by that conference on the outline of standard fire reports. Suffice it to say that the conference was in substantial agreement with the outline given above. The comments of the conference on the question of estimating fire damage, as summarized by Mr. Sparhawk, are as follows:

"It was agreed that estimates of damage for statistical purposes should be independent of calculations made for the purpose of recover-

ing damages before the courts. Our statistical reports should give as nearly as possible the total loss, including losses from a public economic standpoint, while for court purposes the methods of figuring damage and the amount claimed may be largely influenced by precedents and principles recognized by the particular court concerned in each case.

"It was agreed that for the present, it is not possible to standardize methods of estimating damage, either in quantity or in value. Even if trained foresters were in agreement on the subject, which they are not, it would be impossible under existing conditions to get uniform estimates from the multitude of reporting officers, most of whom are not trained to make such estimates. For the present, then, it will be necessary to rely to a large extent on the judgment of the rangers, wardens, or others reporting fires, using such means of instruction and checking as may be found practical.

"It is recommended that research on fire damage in various regions and types of forest be initiated and extended. It was also agreed that a survey of existing research projects on fire damage be made, and recommendations for extending the work be then prepared. Stuart is to circularize the State Foresters on this subject, and the Forest Service (Branch of Research) the forest schools. The information and suggestions thus collected are to be compiled by the Forest Service and distributed to those interested.

"The question of 'what constitutes adequate fire protection?' was discussed at some length without reaching any definite conclusion. Possible criteria suggested were the burning over of a certain percentage of area per year, or the destruction of a certain percentage of values at stake. The idea of minimum ($P + S + D$) was brought up (cost of protection plus cost of suppression plus value of damage), as was the view that because of the great intangible public interests at stake, almost any expenditure for protection and suppression is justified as long as it reduces damage.

"It was suggested that this matter, as well as the question of damages, be discussed further at some time previous to the fall meetings of the State Foresters and the Society."

Following the suggestion made at the conference, Major Stuart sent out a questionnaire to various State Foresters and others who might have done research work which would bear upon the matter of fire damage. The results of this questionnaire developed the fact that the U. S. Forest Service is the only institution carrying on

systematic studies of fire in relation to fire damage. It is doubtful whether those studies are extensive enough to obtain the data desirable in this connection.

The results of the committee's investigations thus far indicate that the methods of estimating fire damage necessarily used at the present time to meet practical conditions encountered in obtaining reports from firewardens and field men, make it impossible to adopt uniform standards for estimating fire damage. We also find it impossible at present to agree, or find substantial agreement amongst foresters on what constitutes adequate fire protection.

It is felt that the research work now being carried on by the U. S. Forest Service should be continued and that the Service should call upon other agencies who are able to give assistance in this kind of research in order that sufficient information may be obtained to make it possible eventually to set up uniform standards for estimating fire damage.

Respectfully submitted,

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*Secretary, Department of Forests and
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REPORT OF THE COMMITTEE ON THE HISTORY OF FORESTRY IN THE UNITED STATES

To the Society of American Foresters in Annual Meeting Assembled:
The committee requests that members of the Society should comment in the JOURNAL on the scope of its work.

At the last annual meeting the suggestion was made by Mr. Sparhawk in his report as Secretary that "while forestry is still young in

America, and most of the pioneers are yet with us, is the time to begin the gathering of accurate, first-hand records of the beginnings and subsequent development of the profession and practice of forestry in North America." Acting upon that suggestion a motion was made that the President of the Society be "instructed to appoint a committee to plan and initiate the collection and compilation of material for the history of forestry in the United States and Canada." It was subsequently decided that the field of this committee should be confined to the United States. A committee of seven was appointed.

Unfortunately the committee is so widely scattered over the country that it has been unable to meet together for discussion. What it has to report and suggest at this time is therefore based entirely upon correspondence.

The committee understands its principal duty for the present to be preserving for posterity material which might sometime have historical value, and which is liable to be lost. This information is chiefly of three classes—printed, manuscript, and unwritten.

In order to assemble the suggestions of each committeeman as to the best ways of going about to get this material, the chairman sent out a questionnaire, asking advice on eight topics. Perhaps the most direct way to illustrate the points the committee wished to settle first, and to report to the Society at large, the suggestions and conclusions reached, is to recite each question and the substance of the replies.

Question One.

"Should this committee at this time attempt to do anything with printed material, that is, material which is likely to exist in some type of university or Government library and be available to scholars for some time to come? If so, how do you suggest the Society go about getting this material assembled, classified, described, or listed?"

It is apparent that most, but not all, the *printed* material on forestry of possible historical value is likely to be preserved in libraries, but the committee should make some effort to get together such incidental printed documents, as, for example, unnumbered circulars of State foresters, or arguments in support of legislative measures, which may never have got into technical libraries. For the present the mere collection of rare or obscure printed material is urgent; later the classification and description of it should be attempted. One suggestion is that the Society should ultimately build up a synoptical index of such material, perhaps supplementary and not duplicative of the Forest

Service library index, or such bibliographies as exist in Forest School libraries.

Question Two.

"Do you know of any (other) valuable collections of manuscripts, and what provision do you suggest to make them available to posterity?"

Information which the committee has shows that there are numerous collections of manuscripts of value, some of which are assured of preservation and some of which are not. Here are some of them. Perhaps members of the Society may know of others, and if so, please suggest them to the committee.

A number of years ago (about 1911-13) Mr. Pinchot asked a large number of men to write their reminiscences and it is understood over 100 responded, some very briefly, some very fully. This is a valuable record of personal connection with early forestry days. It is in the safe keeping of P. P. Wells.

Mr. Pinchot's personal correspondence and papers concerning the conservation movement, now in the hands of P. P. Wells for editing for publication.

Edward Bowers' papers on early public land matters, now deposited with the Yale Library under an injunction of secrecy for the present.

Eugene Bruce's document about the Minnesota National Forest, probably in the keeping of his widow.

Professor Fernow left a large collection of papers which will likely be kept safe and available for use through Professor Hosmer.

A manuscript, historical compilation of the public land laws of the United States, annotated by P. P. Wells.

Material relative to the Weeks Law in the files of the Society for the Protection of New Hampshire Forests.

In the files of the New York Conservation Commission, the history of the Adirondack Preserve.

The files of various State Foresters and of State Forestry Associations contain the original material on the development of the forestry movement in that state which may or may not be preserved unless some special attention is called to its permanent historical value.

Professor Sargent's papers relative to the early National Academy of Science Committee, etc.

Question Three.

"As it is clearly out of the question that this small committee ferret out all the manuscript material bearing on this subject in the country,

some system for doing so should be devised. What do you suggest? Should sub-committees be appointed, each to handle a specific field? Should the entire membership of the Society be solicited through the columns of the JOURNAL for suggestions on this matter?"

It is agreed and this committee recommends that the entire membership of the Society be asked, through the columns of the JOURNAL, to suggest manuscript collections that should be preserved and to make arrangements therefor. The committee also proposes to call upon individuals or to appoint small sub-committees to gather up the material on certain specialized topics with which the individual or the sub-committee is particularly in close touch.

Question Four.

"If the field is to be divided up according to topics and a sub-committee appointed to handle each, have you any topics to suggest other than those mentioned in Professor Hosmer's letter to you? Have you any suggestions as to those best qualified to handle each topic?"

The committee already has a number of names in mind of those who are particularly familiar with the historical documents on special subjects or in certain regions, but it will welcome proposals from the membership of the Society, either those who are willing to volunteer in ferreting out material, or suggestions of the names of those who are especially qualified to be of service in this cause and might help.

Question Five.

"What arrangement do you suggest for 'archiving' this manuscript collection?"

The Society, with no quarters of its own, must make some arrangement to store in a secure and fire-proof fashion such material as may be donated or entrusted to it. It has been proposed that it be stored in the vaults of the Forest Service Office so long as space will permit, or that it be entrusted to one of the forest schools that could furnish safe storage, or that the Society purchase a small trunk to be left in a storage warehouse or with a safe deposit company. This is a problem which need give no worry until the amount of material gets large. The committee realizes the importance of making safe provision for the keeping of any material that may come to it. Some of the collections which are located may not actually be turned over to the Society for keeping, but may be stored elsewhere, as mentioned above in the case of some of the existing collections.

Question Six.

"How might this committee go about getting unwritten material of possible historical value?"

There are a number of the pioneers of forestry whose memory contains an unwritten interesting historical story. We feel that a special effort should be made at once to individually ask each of these to write a memoir of his personal connection and knowledge of important epochs of forest history. This would be supplementary to what Mr. Pinchot got over 10 years ago, canvassing those who did not contribute then and adding material which has accrued since then. To get a complete list of those who have had intimate connection with the "unwritten history" of forestry, it is proposed that a request for suggestions of names be placed in the *JOURNAL* and in *American Forestry*. It is also suggested that the forest schools help by encouraging their students to write historical theses on particular topics based on original search of unwritten or unpublished sources.

Question Seven.

"What names do you suggest as possible sources of unwritten material and what field or topics might each cover, to supplement the unwritten historical record of American forestry?"

Most of the older men in the profession have memories of incidents without which the history of American forestry would not be quite complete. The committee feels that their story should not be lost to posterity. Such names as Roth, Schenck, Gaskill, Sargent, Ahern, and many more have been suggested, and the list should not stop with those who already have stepped aside from active participation in forestry affairs.

Question Eight.

"Are there any particular incidents or phases of forest history, yet unpublished, which our committee should make a special effort to go after?"

In answer to this query, the committee has no concrete suggestions to offer at this time. It is necessary first to take more thorough stock of what is existant or obtainable before determining what is lacking to make the historical record complete.

Summarizing, our recommendations are as follows:

The committee should first address itself to the task of (1) assembling obscure printed material not in the principal libraries, (2) locating

and arranging for the preservall of manuscript files, reports, personal correspondence and the like bearing on the forestry movement in the country, (3) encouraging the writing up of their memoirs by the pioneers of forestry and the narration of incidents of unwritten forestry history by those who possess special knowledge thereof, and (4) providing for the safekeeping of any material that may be assembled.

It is a larger, but less urgent task, to classify, list, and describe and so make available for the student the material that may be collected. That is work for a professional. It would be a splendid thing if the Society had the funds to employ a trained scholar to arrange, sift, and digest all that may be collected. It is possible that if the manuscripts appeared to have sufficient value and interest, some help could be secured through an agency such as the Department of Historical Research of the Carnegie Institution, or the Historical Manuscript Commission of the American Historical Association.

The further work of the committee should be the carrying out of the program which has just been proposed.

Respectfully submitted,

PHILIP P. WELLS.

PAUL G. REDINGTON.

PHILIP W. AYRES.

RALPH S. HOSMER.

LOUIS S. MURPHY.

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